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# MINNESOTA MEDICINE

*Journal of the Minnesota State Medical Association*

VOL. IV NOVEMBER, 1921 No. 11

## ORIGINAL ARTICLES

### THE DIAGNOSIS AND TREATMENT OF CHRONIC LESIONS OF THE HIP JOINT*

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*Milwaukee, Wis.*

The title of this paper, Chronic Lesions of the Hip Joint, will perhaps suggest the pertinent questions—"Why single out the hip joint?" and "Are not all joints subject to the same diseases?"

As a matter of fact there are several conditions which are peculiar to the hip joint, so that it has seemed worth while to the writer to present a brief review of the diseases and conditions met with. For the surgeon especially trained in bone and joint surgery, there will be very little illuminating in my remarks, but the general practitioner, as a rule, does not see so many of these cases but what a brief presentation of the subject may be helpful, even if it does nothing more than summarize the important points in the differential diagnosis.

In spite of the fact that the hip joint is deeply seated and less readily accessible than most other joints, the lesions which it is subject to, can be fairly readily recognized. This does not imply that difficulties in diagnosis may not arise. Not infrequently diagnosis must be deferred until continued observation and study clear away doubtful points. In the great majority of cases, however, the statement that hip joint lesions are fairly readily recognizable does hold true. This is due in part to the comparatively limited number of chronic affections we have to deal with and in part to the well differentiated characteristics of these affections.

As in the study of any disease or condition, a careful history is essential. In fact, in many cases this will enable one to make at least a tentative diagnosis. Physical signs, roentgenologic and laboratory findings all have their proper place, and, especially in the unusual case, should be considered in proper order. It is a good practice to defer study of the x-ray thrust at you by the patient who is very apt to think that this bit of evidence will settle all doubts as to the real nature of his trouble.

In the examination of hip lesions it is important to strip the patient completely and to conduct the examination according to a definite plan, just as the internist proceeds according to plan in the examination of a chest. Unless this rule is followed it is very likely that errors will occur. This is especially true in differentation of lesions of the lower lumbar spine.

Inspection will disclose peculiarities in posture and gait, deviation from normal contour, awkwardness in removal of clothes or in getting on the examining table.

Palpation will determine the presence of muscle spasm, loss of normal muscle tone, elevation of surface temperature and tenderness. Mensuration is necessary to determine the degree of atrophy, apparent and real shortening, disturbance in relation of Bryant's and Nelaton's lines. The determination of range of motion, active and passive, and careful recording of findings is important not only in establishing the diagnosis but also for purposes of comparison with future records. A few moments' consideration of the last point may be worth while. It is considered good practice to begin testing the range of motion on the sound side, and in children I have found it of help to count out loud to them while the various movements in flexion, abduction, adduction rotation, etc., are carried out to their limits with gentle continued effort. A crying child will often become quiet and listen

*Presented before the Southern Minnesota Medical Association, Winona, Minn., June, 1921.

to the counting as though deeply interested and offer no voluntary resistance to these passive movements. Flexion is tested first. The left hand is placed under the patient's back to detect the slightest diminution in lordosis as the leg with extended knee is raised. This indicates the limit in flexion. This is estimated in degrees and the leg again allowed to come slowly to the table. All sudden movements are to be avoided. In testing for abduction the thumb and middle finger are placed gently on the anterior-superior spine, right and left, while the right hand carries the leg with the knee extended into gradually increasing abduction. When the pelvis begins to move the degree of motion is estimated. Adduction is similarly noted by carrying the limb in the opposite direction. Having thus gained the confidence of the patient similar movements are executed with the affected extremity. Since no force whatever is used in these tests the examination is without pain and can be quickly carried out. In making these tests the patient lies on his back on the table. For the determination of rotation, inward and outward, and hyperextension, it is best to have the patient in the prone position. Again beginning with the sound member, the leg is brought into the vertical position with the knee flexed at right angles resting on the table. The foot is now grasped and carried away from the median line and the degree of rotation inward estimated as soon as the pelvis tilts up on the opposite side. Rotation outward is determined by carrying the foot across the median line until the pelvis tilts up on the same side. The flat hard surface of the table serves to steady the pelvis and the tilt can be readily noted assisted by the fingers of the left hand on the anterior-superior spine of one or the other side. The leg, therefore, is used as a convenient indicator on the imaginary dial so that the range in degrees is easily estimated. This method of testing rotation, that is, with the patient in the prone position, so far as I know, has not been previously described. The advantage of the method outlined is that the degree of motion can be determined very accurately in the latter, while, with the patient in the supine position and the leg straight, rotation is less easily and less accurately determined. In addition there is a certain amount of axial rotation at the knee joint in the extended position and in the tarsus which is misleading. Again, if the knee is flexed, the foot resting on the table, one is testing not rotation alone, but rotation combined with flexion and abduction.

The commoner lesions of the hip joint are tuberculosis, Perthes' disease and osteo-arthritis. These will be discussed in the order named, while conditions met with less frequently will be considered later.

Tuberculosis of the hip is so well known to you that little need be said regarding diagnosis. In children a chronic mon-articular arthritis coming on insidiously, whether or not there are demonstrable lesions elsewhere, will prove to be tuberculous in the great majority of cases. A limp, often intermittent, is perhaps the most important sign, while pain not infrequently referred to the knee, due to the irritation of the obturator nerve is quite common. Limitation of motion in all directions is practically unfailing due to spasm of the muscles about the hip. It is important to note that this limitation of motion is readily appreciable even at an early date and that it is about equal in all directions.

The tell-tale night cries result when these muscles are off guard during sleep and allow excessive movement of the tender joint. Perhaps the first muscles to be affected are the psoas and iliacus, spasm of which is responsible for the flexion deformity. This is best demonstrated by the inability of the patient to lie on his back with the lumbar spine and the back of the knee touching the table at the same time. If, on the other hand, hyperextension of the hip is possible to a normal degree tuberculosis may be definitely ruled out. I have not found this rule to fail. When the disease starts in the trochanter or neck at some distance from the joint, this uniformity in limitation of motion is lost. Technically these cases are not tuberculosis of the hip joint and would be excluded from consideration by the title of this paper. Clinically, however, they must be kept in mind and differentiated from true hip joint lesions.

The determination of actual and apparent shortening and of atrophy of the calf and thigh which is a constant and early sign is important. Temperature record and tuberculin tests also

are of aid in doubtful cases. Sinuses and abscesses occur at a stage when the question of diagnosis can no longer be a troublesome one.

The x-ray evidence is very valuable. The contour of the bone in early cases is interfered with little if any, but there is a haziness of the bone about the lesion so that the picture is often regarded as unsatisfactory. Repeated efforts yield no better results, though the sound joint taken for comparison shows the cancellous structure of normal density. The actual focus of disease is represented by irregular, fluffy, poorly circumscribed, darker areas. There is no periosteal thickening. Bone production occurs only in the very late stages when the processes of repair have been well under way. The presence of bone hypertrophy in the early or moderately advanced stages should lead to suspicion of lesions of other nature. Tuberculous lesions of the lumbar vertebrae are not infrequently mistaken for hip disease. An early lesion in this location is only rarely demonstrable in the x-ray. Spasm of the iliopsoas on one or both sides with consequent flexion deformity at the hips, and tilting of the pelvis and decided limp are frequent. The absence of local tenderness about the hip and freedom of motion in all directions, except extension, will eliminate a hip lesion. As a rule there will be tenderness over the lower spine and marked restriction of motion in spinal movements in the lower lumbar segment. Tuberculous lesions of the sacroiliac joint are comparatively rare. Here too there will be freedom of motion in the hips in all directions except in flexion and extension because of spasm of psoas and lumbar muscles while on grasping the crests of the ilia and making lateral compression of the pelvis there will be pain, locally or referred down the leg. Except in late lesions x-ray findings are frequently negative due to the thickness of the bone and the irregular conformation of the joint.

The essentials in treatment are adequate fixation in plaster or brace and relief from weight bearing, the surgeon relying on the particular form of fixation which he is best able to carry out. In children operative measures are indicated only in exceptional cases, while in adults operative ankylosis of the joint or arthrodesis, in other cases resection, may be called for when conservative treatment fails.

In the foregoing, emphasis has been laid on the fact that in tuberculosis the limitation of motion is fairly uniform in all directions. This is an aid in differentiation of Perthes' disease, a more benign self limited affection. In Perthes' disease the limitation in motion is in abduction and frequently also in rotation outward while other motions remain free. This condition has attracted a great deal of attention within recent years. Calve in 1912 had collected a group of ten cases most of which had been treated for tuberculosis for some time but which differed from tuberculosis in several important features. As in hip disease, the lesion is a chronic one and usually unilateral, but the symptoms are of decidedly milder type. Pain and limp are comparatively slight even in the absence of fixation by protective apparatus. Atrophy is less marked even in long standing cases and the disease is practically self limited. The x-ray findings are also very characteristic. It is a disease practically confined to children between the ages of five and ten. Calve described these cases as pseudocoxalgia to differentiate them from coxalgia or hip tuberculosis. Legg of Boston reported a number of cases prior to this as "an obscure affection of the hip joint" but it was not until Perthes' classical description of the condition in 1913 that wide-spread interest was aroused and that cases were more generally recognized. It has therefore come to be known in the literature as Perthes' Disease, or Osteochondritis Deformans Juvenilis, the name proposed by Perthes in his original publication.

The etiology of this condition is still obscure. Nutritional disturbances, mild infections, imperfect osteogenesis, and even syphilis have been regarded as the important factors.

The roentgenograms in these cases show characteristic changes in the epiphysis of the head of the femur. The contour of the epiphysis suffers decided change. There is an irregular flattening of the rounded head apparently due to a crumbling or fragmentation of the epiphysis. The neck is frequently broader and shorter than on the normal side. Strangely enough this lesion affects no other joint in the body. A possible exception to this is the astragalus. Within

the past few years a number of cases of isolated disease of the astragalus have been described, with x-ray and clinical findings analagous to Perthes' disease.

Treatment consists of protection of the joint by plaster cast or at the onset, if the discomfort is considerable, by traction for a week or two followed by plaster. In very active children this may have to be continued longer, in order to prevent more marked deformity of the head. The clinical course will have to guide one as to the duration of fixation while x-ray at intervals will also be helpful to determine the progress of the condition. Only a few cases have been observed into adult life, and it is a question just what permanent changes will result. The view has been expressed and it is entirely likely that these cases may predispose in the aged to osteoarthritis.

In the consideration of hip lesions in patients past middle life, first place should be given a condition variously known as osteoarthritis, senile coxitis, hypertrophic arthritis or arthritis deformans of the hip. The essential feature is a bony deposit about the margins of the head and acetabulum. This condition deserves emphasis for two reasons, first, because it is probably the most frequent hip lesion met with in adults past middle life, and second, because it is not recognized as generally as it should be. The term senile coxitis is misleading since the date of onset of the trouble in not a few cases may be placed in the late thirties or early forties. In a great majority of cases, however, the onset occurs after the fifth decade. The condition is characterized by a very insidious onset and a chronic progressive course. Pain is one of the earliest and most important symptoms. It may be local or referred to the groin, trochanter region or down the back of the thigh due to the involvement of the nerves supplying the hip joint. Occasionally there is paresthesia or tingling rather than pain along the same route, while now and then there may be a sudden catch in walking or on movement of the thigh, even while lying down, presumably due to impingement of the thickened femoral head against the borders of the acetabulum. Stiffness, most marked in the morning, or during the first few steps after sitting for some time, is often noted. After being about for a few minutes the joint is said to limber up only to have the symptoms aggravated later in the day because of continued use. The absence of pain on resting the joint is of value in diagnosis. The hypertrophy of bone is especially apt to occur at the outer and upper borders of the femoral head and the contiguous portions of the acetabulum. The position of adduction is therefore assumed to prevent impingement of these processes, one against the other. Apparent shortening and consequently a limp, varying in degree with the degree of adduction must necessarily result. In older cases, not infrequently, there is also a real shortening due to erosion of the acetabulum as well as to a flattening of the head of the femur. Motion is distinctly and markedly limited. As a rule, however, certain motions appear to have escaped restriction and are normal in range. This distinguishes it rather easily from tuberculosis. As a rule abduction is the most interferred with while adduction may be perectly normal. Likewise, rotation inward is apt to be more free than rotation outward. Creaking of the hip joint on motion, often unaccompanied by pain is occasionally met with and may be audible at some distance from the bed. Atrophy of the muscles of the thigh and leg is comparatively slight even in long standing cases, while in tuberculosis this atrophy is very early and more marked. The trochanter may appear rather thickened on palpation but there is no infiltration, no bogginess of the skin or tenderness about the joint on palpation. Constitutional symptoms are absent. Occasionally other joints show similar changes, notably the terminal finger joints, the Heberden's nodes and recognition of these will be of material assistance in making the diagnosis. The x-ray findings are characteristic. At the margins of the articular cartilage there is an increased deposit of bone or a lipping and at the point of attachment of muscles there are frequently hook-like- processes. In places there is increased density of the bone and the outlines are sharp giving a good contrast in the roentgenogram. While the clinical signs in themselves are sufficient to distinguish the condition, the x-ray will remove the last doubt.

Exposure to cold and damp, also chronic in-

fections, have been regarded as predisposing. It is well recognized that trauma, either a single severe injury, or often repeated lesser insults, are likewise influential. The fact that males are more frequently afflicted than females, lends weight to trauma as a factor. Mr. R. Llewellyn Jones has pointed out "that the clinical appearance presented by osteoarthritis of the hip in its more advanced stages may closely simulate those met with in impacted fractures of the neck of the femur and when we bear in mind the insidious onset of the disease it is easily seen how readily an error in diagnosis may take place in such a case when an intercurrent-injury, involving the previously diseased joint has occurred."

The ultimate result in cases of osteoarthritis is very marked disability due to increasing adduction and flexion deformity and increasing limitation of motion. If the limitation of motion would progress to complete fixation, one could at least assure his patient that in this final stage pain would be relieved, but unfortunately ankylosis never becomes complete. A very limited range of motion and with it pain persists. It has been well said of this disease "it sadly embitters, but it does not shorten the duration of life."

The condition is very frequently mistaken for sciatica. It may be well here to emphasize the fact that true sciatica is really a rare affliction, and that most of the conditions termed sciatica depend upon lesions of the sacroiliac or lumbosacral joints. Practically the only motion interferred with to any extent in sciatica is flexion-Kernig's sign. Abduction is usually free, inasmuch, as this does not cause tension on the nerve trunk.

The treatment is very unsatisfactory. Rest and baking are of value in relieving pain. In severe cases some light appliance restricting motion to the painless range may be recommended. Operative removal of the bony outgrowths or even arthrodesis of the joint may be indicated in special cases. Recently Sir Robert Jones has recommended forcible manipulation under anesthesia, stating that freedom from pain for several years is not unusual.

Tabetic arthropathy of the hip is comparatively rare. The signs presented are those characteristic of Charcot joints elsewhere, namely, limp, general enlargement of the joint and comparative freedom from pain. The marked relaxation of the capsular structures allows abnormally free mobility. The coarse, crunching sensation on motion gives evidence of marked destruction of the joint. The thing which impresses one most in these cases is the astonishing freedom from pain and slight interference with function in view of the tremendous joint destruction. The x-ray shows processes both of destruction and proliferation, the latter often predominating. With exception of the kneee, Charcot's disease affects the hip more frequently than any other joint. It is said that in about 20 per cent of the cases the joint symptoms precede the tabetic condition. In these cases the diagnosis may be less readily made, but should offer no special difficulty in view of the well defined characteristics of the condition.

Of other forms of neuropathic arthritis of the hip, the only one met with by the writer was one in connection with spina bifida. In this case there was marked destruction of the femoral head and "wandering" acetabulum, without bone proliferation. Syringomelia is so rare that it is merely mentioned in passing.

Coxa vara is another condition to be kept in mind in the differential diagnosis of hip lesions.

The term "coxa vara", it will be recalled, is applied to that condition in which the neck of the femur is bent downward, so that the angle formed by the neck and the shaft approaches the right angle. Normally this angle should be about 135 degrees. There are various types of this deformity, the rachitic, the traumatic following partial separation of the epiphysis of the femoral head with imperfect reduction and the adolescent in which the alteration is due to disturbance of growth as a result of trauma of weight bearing at the epiphyseal line, resulting in the deformity referred to.

The differentiation of these various forms is usually not difficult from history and physical findings as well as x-rays.

Congenital dislocation of the hip deserves only a word in passing. There is a history of limp from earliest childhood. Absence of pain and muscle spasm are important and the x-ray shows the head displaced above the level of the

acetabulum. The amount of displacement can be roughly measured by the break in what has been called the diagnostic line.

Pathological dislocation, by which is meant dislocation of the head of the femur out of the acetabulum as a result of acute septic arthritis, is not a very rare condition. It is usually a sequel to acute infections e. g. otitis media, tonsilitis, etc.

Perhaps it may not be out of place to state that in the majority of cases these dislocations are preventable by continued traction. The dislocation is very apt to occur as the result of the marked distention of the capsule by inflammatory exudate, associated with abnormal position maintained because of extreme pain. The thigh is usually drawn upward and rotated inward so that dislocation of the head over the posterior edge of the acetabulum occurs not infrequently. This is facilitated by the effect of gravity, the more or less perpendicular position of the thigh in marked flexion during recumbency favoring the pushing of the head downward and out of the socket. Muscle spasm, in addition, has a further tendency to pull the head out of the socket from this predisposing position.

Several instances are recalled of subacute monarticular arthritis of the hip of non-tuberculous origin in children in which tuberculosis had to be seriously considered in establishing the diagnosis. In these the comparatively recent origin of the disease and the complete freedom of motion in certain directions were the essential points upon which the decision against tuberculosis rested. Recovery followed a comparatively short period of traction.

A number of miscellaneous affections, osteitis fibrosa of the neck of the femur, chronic inflammatory conditions of bursae about the hip joint, sarcoma of neck and trochanter and also congenital malformation have been encountered. In all of these the clinical signs have been sufficient to exclude any of the conditions mentioned. In many of these the x-ray has come to the rescue in establishing the final diagnosis.

DISCUSSION

DR. H. S. HENDERSON, Rochester: Dr. Gaenslen's paper is very broad and comprehensive; it covers many important points, any one of which would make an interesting subject for discussion. I wish to thank him personally for presenting the subject, because there are probably more errors made in the diagnosis of hip joint troubles than any other joint. I will speak of a few points that are of practical importance. When a patient comes to us for examination he should be completely stripped. A patient comes into the office and because of a stiff hip cannot get his shoe off, he slips his combination underwear down a little, and you try to examine him. The amount of limitation of motion cannot be estimated with the patient in this condition. It is better, so far as range of motion is concerned, to examine for motion with all his clothes on.

Dr. Gaenslen spoke of pain in the knee in cases of tuberculosis of the hip. All too freqeutly we see casts on the knees of patients who have tuberculosis of the hip. Patients with Perthe's disease usually recover within a year. Probably the patients we think we cure early do not have tuberculosis of the hip joint; it may take five or six years to bring about a cure in such cases.

We see also too often patients whose cases have been diagnosed osteoarthritis, and hypertrophic arthritis of the hip when they have fracture of the hip. Every hip joint injury should be examined by the roentgen-ray.

## STUDIES ON THE RESPIRATORY ORGANS IN HEALTH AND DISEASE*

## III. THE VALUE OF VITAL CAPACITY READINGS IN CLINICAL MEDICINE.

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*Minneapolis, Minn.*

Hutchinson in 1846 gave a description of the spirometer which he had invented and pointed out its extreme value in the diagnosis of early pulmonary tuberculosis. Probably because instruments of this kind were not made available sight was apparently lost of vital capacity work for a long time, except for an occasional investigator, such as Arnold (1855). Recently, however, the value of lung capacity readings is being more appreciated and one is safe in predicting that the time is not far distant when such readings will be looked upon as an indispensable part of every complete physical examination.

After making a careful study of the Importance of Vital Capacity in Thoracic Surgery,

*Presented at the fourth annual session of Minneapolis Clinic Week, April 25-28, 1921.

Graham (1920) arrived at the following conclusions:

"Determination of the vital capacity by means of a spirometer, when used in connection with the mathematical expression given in the text, will indicate approximately the maximum opening in the chest wall compatible with life, if the mediastinum is not already stabilized by adhesions and induration. If such observations are made before establishing open drainage in cases of empyema or before any thoracic operation, doubtless many lives will be saved. Both theoretical conclusions and actual observations show that in empyema the vital capacity is greatly reduced. That this reduction does not depend merely on the presence of the fluid exudate in the pleural cavity is shown by the fact that an appreciable increase in the vital capacity occurs only gradually after the removal of the exudate. This fact is of importance in being an additional argument against the establishment of an open drainage during the acute pneumonic stage of an empyema when the vital capacity is so low as to approximate the tidal air requirement. Extensive thoracoplastic operations result in apparently a permanent marked reduction in the vital capacity. They should be employed, therefore, only in the rarest instances and only after other methods have been given an intelligent trial for at least many months."

Peabody and Wentworth ('17) Ulrich and Nathanson ('21) and others have shown that in cardiac disease vital capacity readings are of great value not only in diagnosis but also in guiding the patient's activities and in rendering a prognosis.

In diseases of the lungs such as tuberculosis, abscesses, asthma, bronchiectasis and pneumonia, Hutchinson ('46), Arnold ('55), Peabody and Wentworth ('17), Garvin, Lundsgaard and Van Slyke ('18), Dreyer ('19), Dreyer and Burrell ('20), Wittich, Myers and Jennings ('20), Myers ('21) and many others have found the vital capacity readings a great aid not only in diagnosis of early disease but also in ascertaining the amount of damage done to the lungs and the effect of different kinds of treatment.

In this connection I cannot help but call attention to one of Hutchinson's very striking cases:

"'The most interesting case is that of Freeman, the 'American Giant'. This man came over to England in 1842 and, in the November of that year, trained for a prize fight; I examined him immediately before his *professional engagement*, when he might be considered in the 'best condition'. His powers were as follows: Vital capacity, 434 cubic inches; height 6 ft. 11 in.; weight 19 st. 5 lb.; ————. In November, 1884, exactly two years afterwards, he came to town in ill health. I then examined him in the same way as before, twenty times at various intervals, during which his vital capacity varied from 390 down to 240, and the mean of all the observations was 344 cubic inches, a decrease of 90, or more than 20 per cent; ————. At this time I took him to two physicians well skilled in auscultation, and they both affirmed that they could not detect any organic disease. After January 1845, I lost sight of Freeman, and, in the October following, I was kindly favored with the following account of him from Mr. Paul surgeon to the County Hospital, Winchester. 'Freeman was admitted into this hospital on the 8th of October, in an extreme state of debility and exhaustion; he was reduced almost to a skeleton, complained of cough, and was expectorating pus in large quantities.———— Freeman after death measured 6 feet 7½ inches, weighed 10 st. 1 lb. On opening the chest, the lungs on both sides were found adhering by their apices to the superior boundaries of the thorax, and studded throughout their substance with tubercles. The tubercles, on the whole, were much less numerous in the right lung than in the left: both lungs were nearly healthy at their base; the tubercular matter gradually increased in quantity towards their upper parts, and the apices of both lungs were almost completely occupied by large cavities partly filled with pus, and capable of containing two or three ounces of fluid each. The heart was remarkably small. The rest of the viscera appeared healthy.' ———— The spirometer was useful to me in this case, by indicating the commencement of the disease which ultimately caused his death, and that before the usual means availed."

Personally I have found the lung capacity test very valuable as it has been possible to go through large wards during epidemics of such diseases as paratyphoid and influenza and by means of the spirometer pick out the cases which further clinical data proved to be developing pneumonia. Moreover, it has been possible to visit sanatoria for the tuberculous, take the vital capacity readings, age, weight, height and previous occupation of the patients and classify them into the various stages of the disease with a reasonable degree of accuracy. It should be made clear however that the lung capacity test is not infallible but that it is a distinct aid and is worthy of a part in every completed physical examination.

The great advantage of this test is that it requires little or no previous training for its performance and the instrument is simple and easily portable, thus making the test possible in any place under most all conditions. It has been

pointed out by other investigators that the vital capacity test does the patient no apparent harm even in case of active pulmonary tuberculosis. It would seem, however, that this test better be postponed for a few weeks in cases of hemoptysis.

There are many spirometers on the market at present but I have found none more accurate and more satisfactory in every particular than the Sanborn spirometer made according to the specifications of Peabody and Wentworth ('17).

The approximate normal vital capacity for individuals must be known before the readings are of much significance in the diagnosis of diseases of the chest. Therefore the normal vital capacity for men and women of average physical fitness has been computed according to the mathematical formula of Dreyer ('19). The results of these computations have been arranged in table form (Myers '21) thus making them available for clinicians and research workers. The use of such tables saves a tremendous amount of time. The normal vital capacity varies considerably with such factors as obesity, age, occupation and previous physical training and experience. For example, an obese patient usually has a lower lung capacity than a person whose normal weight is the same and who is of the same age and past physical training and experience. After the age of fifty years there is usually a gradual decline in vital capacity. A person who indulges in athletics, plays a wind instrument or takes other strenuous exercise will have a greater vital capacity than one who leads a very quiet and inactive life. All these factors must be given due consideration in the use of the vital capacity table.

After this table was completed it was found (Myers '21) that the vital capacity of men and women weighing between 100 and 180 pounds could be calculated by two very simple empirical formulae as follows: 17.6 × body weight + 900 = vital capacity (women); 21.2 × body weight + 1168 = vital capacity (men). The figures obtained by the use of these formulae are sufficiently accurate for routine clinical work and may be used to advantage in the absence of vital capacity tables.

A short series of cases will serve to illustrate the value of spirometer readings.

*Case I.* This man of 25 years came in complaining of slight loss of strength, considerable expectoration and a slight cough. Physical examination revealed moderately coarse rales at the base of the left lung. His vital capacity was found to be 2500 cubic centimeters, his height was 168 centimeters and his weight was 115 pounds. A glance at the table of normal vital capacities showed that a man of this weight should have a vital capacity of 3609 c. c. When the physical fitness was computed he was found to be 32 per cent below normal. This patient was immediately sent to the x-ray laboratory. The x-ray report read as folows: "Stereoscopic plates of the chest show a definite bronchiectasis in the left lower lobe. There are a few calcified tubercles in the left apex. Conclusions—healed tuberculosis in the left apex. Bronchiectasis left base."

*Case II.* A woman of 29 years came in on Feb. 11, 1921. She gave a history of slight cough since a cholecystectomy which was done in October, 1920. In the meantime she had a rather severe attack of typhoid fever and had also lost considerable weight. A few weeks before she had been seen by two chest specialists who were unable to find any physical signs of tuberculosis. On February 11th a few rales could be elicited in the first interspace on the right side. Her weight was 101 pounds and her vital capacity was 1900 cubic centimeters. A glance at the table of normal vital capacities showed that she should have a capacity of 2668 cubic centimeters. Her vital capacity therefore was 768 cubic centimeters below normal. After each of the relatives had taken a turn at blowing the spirometer there was no difficulty in convincing them that there was a cause for the reduced lung capacity of the patient and that cause was most likely disease of the lungs. This patient, however, was sent to the x-ray laboratory where the stereoscopic plates showed "a small but definite parenchymal type of tuberculosis in the first and second interspaces on the right side and some bronchial gland enlargement on the left side. Conclusions: Pulmonary tuberculosis in the right upper lobe, calcified bronchial glands on the left side." Unfortunately the lack of sanatorium capacity made it impossible for this patient to be admitted for about a month during which time she did not receive the best of home care. Stereoscopic plates were taken immediately after her admission to the sanitorium where the roentgenologist's conclusions were "Probable tuberculosis infiltration in apices of both lungs."

*Case III.* This patients is a woman of 49 years weighing 135 pounds. She has suffered from bronchial asthma for more than a decade. Her treatment was begun in January 1921, and she has had no sign of asthma since Feb. 1, 1921. Although three months have elapsed since her asthma disappeared. we now see her vital capacity is 2100 cubic centimeters when the table of normal capacities shows that she should have a capacity of 3288 cubic centimeters. In this case the physical examination and

x-ray reveal a severe grade of emphysema which unquestionably is the chief factor in decreasing the lung capacity.

*Case IV.* This young man of 21 years developed a slight cough about three weeks ago. Otherwise he had apparently been in good health. The day before he came for examination, however, he had a slight hemoptysis. The physical examination revealed a slight lagging over the left infraclavicular region. There was no demonstrable change of tactile fremitus, but the percussion note was very slightly impaired both above and below the clavicle on the left. On ausculation a few fine rales were elicited on the left side down to the level of the second rib. Posteriorly there were no abnormal physical findings. This patient is 6 feet tall and weighs 157 pounds. His lung capacity is 5400 cubic centimeters. The vital capacity table shows that the normal capacity for a man of his weight is 4515 cubic centimeters. On first thought one would be tempted to conclude that this patient's chest was clear; however a further series of questions revealed the fact that he had been a wind instrument player over a period of four or five years, and had formerly indulged quite extensively in long distance running. His lung capacity, although much above the average for a man of his size was probably reduced. He was therefore sent in for stereoscopic plates of the chest which showed a "pulmonary tuberculosis involving both upper lobes, being more marked on the left side." This case is cited only to show the possibility of error in diagnosis from lung capacity readings unless one carefully inquires into the patient's past physical development.

*Case V.* This young man became acutely ill and was admitted to a hospital during the recent paratyphoid epidemic at the University of Minnesota. His symptoms were very similar to those of the patients suffering from paratyphoid. It happened that vital capacity readings were being taken on all patients acutely ill in the hospital on the same day. This patient's capacity was found to be 2100 cubic centimeters which was nearly 1800 cubic centimeters below the average vital capacity for a man of this weight. The physical examination revealed beginning pneumonia. I have had other pneumonia patients whose vital capacity revealed disease before any physical signs of pneumonia could be elicited.

*Case VI.* This girl of 18 years gave a history of an attack of pneumonia about 9 months ago. She failed to completely regain strength, develop persistent cough and expectoration. She was then sent to a sanitorium for the tuberculous but repeated examinations of the sputum revealed no tubercle bacilli. The x-ray plates showed a dense shadow in the left basal lobe which was interpreted as representing an abscess. When first seen a few weeks ago her lung capacity was 2000 cubic centimeters and her weight was 101 pounds. The average vital capacity for a woman of this weight is 2668 cubic centimeters. We see her lung capacity is still further decreased at present. This is in part due to the fact that she is now receiving artificial pneumothorax treatment.

*Case VII.* This man came in complaining of dyspnea, edema and cardiac arrhythma. He now weighs 167 pounds and is 5 feet and 10 inches tall. The physical examination reveals a mitral regurgitation and auricular fibrillation. The lungs are clear except for signs of slight passive congestion. There is mild edema of the lower extremities and moderate ascites. This patient's lung capacity is 1700 cubic centimeters which is less than one-half the average capacity for a man of his age and weight. Thus it is evident that the vital capacity of an individual is markedly reduced in cardiac lesions particularly after decompensation begins.

*Case VIII.* This patient presents a case of converse nature. She came in a few months ago giving a history of having been somewhat intimately associated with a relative who had recently died of pulmonary tuberculosis. Her weight had decreased from 148 to 106 pounds and she showed a marked loss of strength. Her lung capacity was found to be 3400 cubic centimeters which is 762 cubic centimeters more than the average lung capacity for women of the same weight. No physical signs of pulmonary tuberculosis could be elicited. The relatives insisted, however, that x-ray plates be made. This was done immediately and the report was as follows: "Stereoscopic plates of the chest show no evidence of pulmonary tuberculosis or other pathology." Further study of symptoms, physical examination and basal metabolism tests revealed that the patient was suffering from thyrotoxicosis.

Dreyer and Burrell ('20) pointed out "that with loss of weight a vital capacity definitely abnormal when calculated in relation to the normal weight of the person might appear normal if calculated in relation to the reduced weight during disease." In emaciated patients therefore the normal weight should be ascertained and the vital capacity calculated for this weight rather than for the actual weight of the patient. This patient's vital capacity calculated for her normal weight was still above the average.

The following three cases illustrate variations in vital capacity due to previous physical development, obesity and senility.

*Case IX.* This man of 29 years is 6 feet tall, and weighs 175 pounds. Before entering college he did much hard labor. He also earned his way through medical school. While in high school he took an active part in athletics. In the University he played on the Varsity foot ball team and took an active part in other forms of athletics. He is also a wind instrument player. His lung capacity is now 6800 cubic centimeters which is 2083 cubic centimeters above

the average for a man of this size. It is therefore obvious that this man could have a considerably decreased lung capacity and still be above the recognized normal. This case serves to emphasize the necessity of carefully inquiring into the past physical experiences of every patient whose lung capacity is apparently normal or above.

*Case X.* About 10 months ago this lady of 40 years was told that she had active pulmonary tuberculosis. She then weighed 127 pounds but she immediately reduced her activities to a minimum and started on the home treatment for tuberculosis. When I first saw her about 3 months ago she was very nervous due to worry concerning her physical condition. Physical signs revealed no evidence of pulmonary tuberculosis nor did she have any of the cardinal symptoms of that disease. In view of the fact that she had been told that active tuberculosis existed she went into the x-ray laboratory, but the roentgenologist's report was as follows: "Sterescopic plates of the chest show the diaphragm shadows clear on both sides, no evidence of fluid in either chest. There is no evidence of pulmonary tuberculosis or other infiltration or consolidation of the lungs." The patient now weighs 165 pounds and, as we see today, has a lung capacity of 2800 cubic centimeters. This capacity is somewhat below the average for normal women of her weight and age, but attention must be called to the fact that she is 17 per cent over weight. Hutchinson (1846) called attention to the fact that after a patient becomes 7 per cent or more over weight the vital capacity is decreased. From the history of this patient together with her present lowered lung capacity an error could easily be made in diagnosis unless an extremely careful examination were made. So far as the history is concerned she may have had a slight pulmonary lesion 10 months ago. If so, it has so completely cleared up as to leave no evidence of its existence. So far as the lowered vital capacity is concerned her tendency toward obesity is sufficient to account for the decrease.

*Case XI.* This man of 72 years, 5 feet 6.5 inches tall, and weighing 137 pounds, has devoted his entire past life to farm work. He has never been seriously ill. Physical examination reveals no cardiac or pulmonary pathology except senile changes. His vital capacity today is 2800 cubic centimeters which is considerably below the average for men of his weight. He is in the senile period of life which explains his reduced vital capacity.

## SUMMARY

From the foregoing observations it is obvious that such diseases of the lungs as tuberculosis, bronchietasis, pneumonia, emphysema and abscess materially reduce the patient's vital capacity. Cardiac disease with decompensation also reduces the lung capacity. Therefore in diagnosis of chest diseases spirometer readings are extremely valuable. Such readings are also very helpful in rendering a prognosis, in guiding a patient's activities and in ascertaining a patient's physical fitness from time to time.

A decrease of 10 per cent in lung capacity is ordinarily of no diagnostic significance; a reduction of 12 to 15 per cent makes the case somewhat questionable; while a decrease of 15 per cent or more (barring obesity and senility) usually indicates cardiac or pulmonary disease.

There are certain pitfalls, however, which must be carefully avoided in the interpretation of lung capacity readings. From previous physical experience the patient may have developed a lung capacity much above the average for persons of his size. In such cases a careful history is of great help. The obese individual usually shows a lower lung capacity than a normal individual of the same weight. This decrease in vital capacity may become noticeable when the weight is 7 per cent or more above the normal. After the age of 50 years there is usually a gradual decrease in lung capacity. In emaciated patients the normal weight should be ascertained and the normal vital capacity calculated from this rather than the actual weight.

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## THE VALUE OF THE OPHTHALMOSCOPE IN DIAGNOSIS*

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My reason for bringing this subject before you this evening is the manifest need for a more extended use of the ophthalmoscope by the general practitioner of medicine. The advent of the electric ophthalmoscope has made the examination of the eye grounds so simple and easy to perform that there no longer exists a valid reason for the non-employment of this valuable diagnostic measure.

There is no histology in the body which bares itself in such nakedness to the examining eye as does the tissue of the retina; no blood vessels so exposed to minute investigation. And it is because these vessels reflect the condition of the general vascular system and because the tissue changes are a guide to the changes occurring throughout the organism that we have the chief reasons for the unique position held by a study of the eye grounds in the field of diagnosis. Furthermore, ophthalmoscopy by the direct method magnifies the picture about twelve diameters thereby permitting the most searching examination of the fundus details.

Degenerative changes in the system such as occur in arterio-sclerosis can be detected by the ophthalmoscope, therefore, frequently earlier than is possible by any other method. Albuminuric retinitis and diabetic retinitis are sometimes the first signs that point to the correct diagnosis. Only a few weeks ago a woman complaining of failing vision, presented herself at the eye clinic. The ophthalmoscope revealed a retinitis diabetica; the patient was in ignorance of any systemic disease. It is possible for any oculist, who uses the ophthalmoscope routinely in the course of examinations for the correction of refractive errors, to match this experience with similar ones. The diagnosis of syphilis is strongly suggested by the fundus picture to be described later, in fact, doubt may be cast on the accuracy of repeatedly negative Wassermann tests, in the presence of these findings. Tuberculosis sometimes produces characteristic alterations in the eye grounds, which may be of diagnostic value when the extra-ocular signs are not clear.

It is not my desire to give you the impression that a positive diagnosis can be made solely from the ocular lesions. They always call for other tests; a urinalysis and a Wassermann should be made in every case.

*Changes in the eye grounds due to arteriosclerosis.*—Arteriosclerosis is evidenced in the retina by early and late signs. Among the earlier changes we may note the following: great tortuosity of the small arterial twigs, called by DeSchweinitz, "corkscrew tortuosity"; irregularity in the calibre of the vessels; narrowing of the arteries; loss of transparency of the vessel walls; hyperemia of the nerve head; flattening or indentation of the veins where crossed by arteries (Fig. 1). Among the later changes there are included: hemorrhages into the retina; occlusion of the central retinal artery; thrombosis of the central retinal vein or its branches; and perivasculitis which manifests itself as white lines bordering the vessels (Fig. 2).

Degenerative changes of varied character sometimes occur. These sketches, (not shown here) drawn by the author from the eye ground of a female aged 62, suffering with arteriosclerosis, portray a unique degenerative change of the retina with the deposit of highly refractile bodies (cholesterin crystals) in a large area in the mascular region. They also reveal many of the vascular alterations described above, such as corkscrew arterial twigs, indentations of the veins and narrowing of the arteries.

*Presented before the Ramsey County Medical Society December 27, 1920.

Hemorrhages into the retina due to arteriosclerosis are of prognostic significance; they are followed by cerebral apoplexy in more than 50 per cent. Thrombosis of the central retinal vein or of its branches has a like prognosis; of 17 patients observed by Geiss, ranging in age from 40 to 70, with marked retinal arteriosclerosis, all suffered attacks of apoplexy within 4 years.

I am able, fortunately, to present a clinical case of thrombosis of the central retinal vein for your consideration this evening.

Mrs. V. B., aged 52, suddenly lost the vision of left eye 14 months ago. Family history: mother died of pulmonary tuberculosis 27 years of age; otherwise negative. Past history: has always been well until 14 years ago when there began to occur what she describes as hot flushes, the face assuming at these times, a purplish tinge. These attacks were excited by various emotions such as surprise, chagrin, etc., and by exertion. They have become more noticeable during the past few years. History of present illness: The loss of vision of the left eye 14 months ago was accompanied by no pain. She discovered it accidentally when some object happened to intercept the vision of the opposite eye. She applied for treatment at the eye clinic Jan. 20, 1920, a number of weeks later. Eye findings: At this time the left eye ground revealed numerous hemorrhages throughout, obliterating for the most part the details of the fundus. Here and there a dark, turgid, tortuous vein would appear only to bury itself again under another hemorrhage a little further on. Occasional spots of grayish exudate were to be seen. The outline of the papilla was lost, its position being inferred from the convergent direction of the vessels and the striations of hemorrhages. Vision was reduced to the perception of hand movements. Course: She was observed at intervals, there being noted from time to time a gradual clearing of the retina through absorption of the hemorrhages and slight improvement of the vision (up to the perception of fingers at 8 feet). Now and then fresh isolated hemorrhages would occur from one of the larger venous branches. The last one was noted on Nov. 30, 1920, about one month ago; this was from the superior temporal branch. At the present time you will observe that the veins are slightly narrowed and noticeably light in color (Fig. 2). At a point along the superior temporal branch, about 2.5 disc diameters from the papilla, a sudden tortousity occurs. At a similar point on the inferior temporal branch a like phenomenon is noted, this one being more pronounced and reminding one of the convolutions of the renal glomeruli. At this point also, a new anastamosis is to be seen. The arteries are so narrowed as to be almost invisible and in places are entirely obliterated and

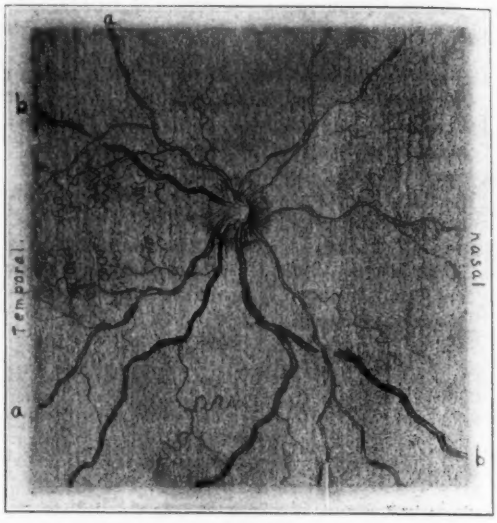


Fig. 1. Scerosis of the Retinal Vessels. Note the corkscrew like tortuosity of the small arterial twigs especially in the region of the macula; the irregularity in caliber of the vessels; the indentation of the veins where crossed by arteries (superior temporal and inferior nasal); the injection of the papilla and slight blurring of its margins.

replaced by white lines; note particularly the superior temporal artery. Vitreous opacities slightly blurr the details but faint light spots are to be seen in the macular region. There is no likelihood of future improvement in the vision because of the interference with the nutrition, and resulting atrophy, of the retina. Hemorrhages may recur indefinitely and secondary glaucoma may supervene. Blood pressure findings Jan. 20, 1920 were systolic 200, diastolic 115. Present findings are about the same.

*Changes in the eye ground due to chronic Bright's disease.*—Albuminuric retinitis is characterized by the presence of white or yellowish spots in the retina, hemorrhages, edema, and blurring of the outline of the disc. These changes occupy particularly the region surrounding the papilla. The white spots may coalesce forming large irregular patches. The so-called typical picture includes the stellate figure at the macula which consists of radiating white lines and spots having the fovea centralis for its center. This figure, however, is not present in all cases and must not be considered essential to a diagnosis. The nerve head is involved in various degrees of swelling; when noticeable the picture is termed neuroretinitis albuminurica. Cases of albuminuric choked disk occasionally occur.

The prognosis is poor. It is rare for one to live longer than two years after the development of a retinitis albuminurica; this of course, does not apply to those benign forms such as occur in pregnancy and in scarlet fever.

Figure 3 illustrates a markedly advanced neuro-retinitis albuminurica and shows the eye ground of a patient with chronic nephritis two weeks prior to his death. Please note the swelling of the nerve head (there was an elevation of 2 dioptres) and the prominent milky edema of the retina especially noticeable in the region of the papilla. The veins are dark and somewhat tortuous; there are many hemorrhages most of which are linear and striated showing their position to be in the nerve fibre layer. This case has the following history:

Case, F. A., age 53, plasterer, seen Mar. 10, 1920. Illness began 1½ years ago, with cough and heart embarrassment. Vision became impaired 2 weeks ago; could no longer read newspaper print one week ago. Vision: R. eye, counts fingers at 6 feet; L. eye, counts fingers at 5 feet. Albumin and casts present in large quantities. Blood pressure, systolic 220, diastolic 150. Heart enlarged; loud murmur.

Of more value than the recognition of the outspoken retinal lesions which represent the more or less typical ophthalmoscope pictures of disease, is the ability to recognize the minute changes that occur early in the course of the renal disturbance.

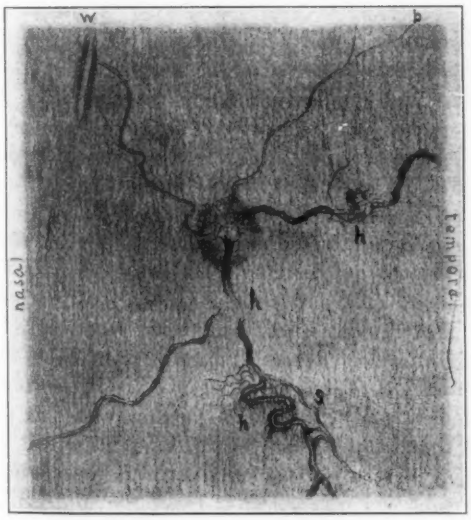


Fig. 2. Old Thrombosis of Central Retinal Vein. Left eye-ground of same patient as Fig. 1, thrombosis having occurred 14 months ago. Note the complete disappearance of many retinal vessels, others (b) are replaced by white lines; the sites (h) of former rupture of veins with massive hemorrhages into the retina; the new anastamosis (s); and the white streak (w) representing connective tissue proliferation, (retinitis proliferans).

Here we have alterations in the vascular tunics similar to those occurring in arteriosclerosis. There are, indeed, many phenomena common to both diseases, so that in the incipient stages it is usually impossible to differentiate one from the other. Only later in the course do the symptoms of one or the other become predominant. We have, then, in the study of the eye grounds, an important means of detecting these early changes, at a time when treatment is most likely to stay their progress.

Chronic interstitial nephritis is the type most commonly responsible for retinitis albuminurica. Next in frequency is the chronic parenchymatous type. Weeks says that in the former, the retinal changes precede the appearance of albumin and casts, and follow the thickening of the vessel walls. In the latter case, the eye symptoms follow the appearance of albumin and casts, and precede the thickening of the vessel walls.

The amount of albumin in the urine is in no wise a guide to the extent of the retinal changes.

*Changes in the eye grounds due to diabetes.*—The changes here are confined usually to the posterior pole of the eye, and consist of small white or yellowish roundish spots, especially in the region of the papilla. The spots are sometimes bunched producing various figures, but the stellate figure in the macula is rarely present. The papilla and vessels are seldom affected. Small hemorrhages are often to be seen between the white spots.

The case of retinitis diabetica I am presenting tonight, reveals many of these changes. Numerous small white and yellowish spots are to be seen in the vicinity of the nerve head. Some have coalesced to form larger and more irregular shaped patches. The more recent ones are more brilliant and sharply outlined and whiter; the older ones are yellowish and tend to blend with the surrounding retina. The papilla and blood vessels are normal and

there are no hemorrhages. The left retina displays a beautiful arrangement of these spots in the form of a circle with the fovea as its center. This is a rare type, called retinitis circinata. We are exceptionally fortunate in being able to present such a case for observation.

These retinal lesions have not the same bad prognostic significance that goes with retinitis albuminurica.

*Changes in the eye grounds due to syphilis.*—A frequent cause of chorio-retinal lesions is syphilis. It is responsible for many of the vascular degenerative changes already referred to under the name "arterio-sclerosis" and in addition excites more characteristic alterations in the choriod and pigment epithelium. This is represented by clumping of black pigment and by white patches. The pigment spots may take various shapes; they may be round, irregular, webb like, and they may form delicate mantles over the smaller retinal vessels, or form black bands around white patches.

Hereditary syphilis is sometimes discovered by finding dense black roundish spots in the most anterior portion of the retina. Atrophy of the choroid and retina in the form of small or large, round or irregular white patches surrounded by a black ring is caused by syphilis. In these patches the vessels of the choroid may be partially or totally obliterated and in the latter case appear as white bands. If the choroidal pigment has been displaced the sclera may be seen bluish white.

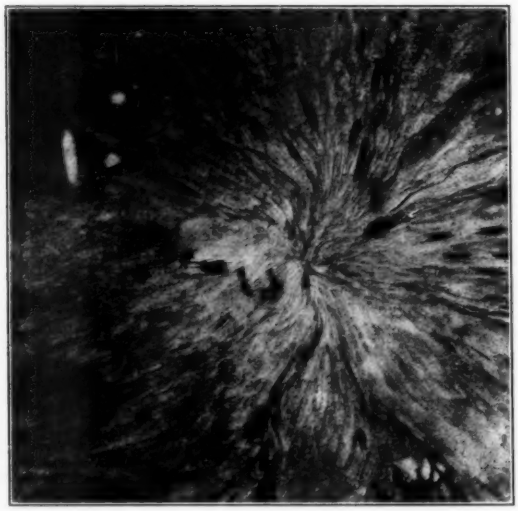

Fig. 3. Neuro-Retinitis Albuminurica. Right Ocular fundus reveals a few white spots and numerous striate hemorrhages in the vicinity of the papilla. A papilledema of 2 dioptres elevation is present. Obscuration of the outline of the disk is complete. The edema can be seen to cover the vessels in places as a veil. The veins are thick and tortuous, the arteries slightly narrowed. In places they are entirely lost to view.

A type of syphilitic chorio-retinitis is displayed by a patient presented this evening. In the periphery of the retina, especially the lower outer quadrant, and in the macular region, densely black spots are visible. The papilla is atrophic and of a dirty yellowish tone. The veins are small and the arteries so narrowed as to be almost invisible. The markings of the choroid are exceptionally distinct because of atrophy of the pigment layer. In the vicinity of the papilla the choroidal vessels reveal evidences of sclerosis. In the left eye there is evidence of an old iritis in the form of posterior synechia. In the presence of these eye ground changes coupled with signs of old iritis I believe the eitology to be lues in spite of the negative blood Wassermann. Further blood and spinal fluid tests will be made.

The changes described above represent the essentially chronic changes of syphilitic chorio-retinitis or the old lesions to be seen after the exudative inflammation has run its course.

Acquired syphilis may be the cause of either diffuse or circumscribed changes. The diffuse type is characterized, during the inflammatory stage, by general cloudiness of the retina with occasional patches of deeper gray. As the inflammatory phenomena disappear, alterations in the pigment epithelium occur, resulting in a migration of pigment into the retina and the formation of irregular figures as in retinitis pigmentosa. I am unable to show you this affection at this time but I have managed to bring here a patient with retinitis pigmentosa so that you may view, at least, the spider like figures of pigment.

Papillitis due to syphilis is apt to be marked by pronounced blurring of the outline of the disc and a peripapillary edema of 2 disc diameters.

*Changes in the eye grounds due to tuberculosis.*—Of recent years, through the employment of

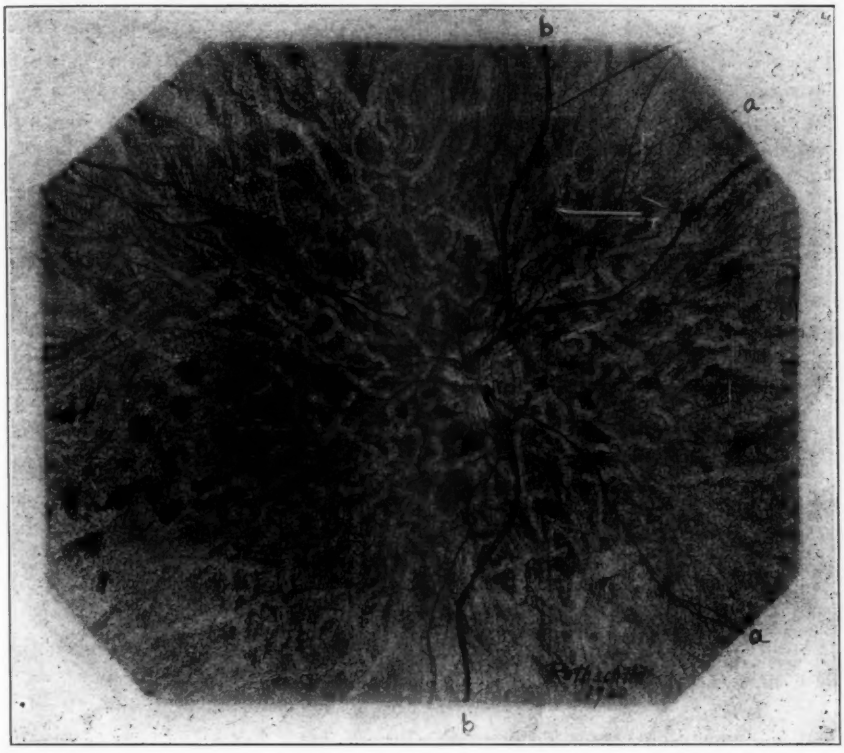


Fig. 4. Chorio-Retinitis Sypilitica. Right eye-ground of male, age 50. Atrophy of pigment epithelium of the retina allows marking of the choroid to stand out sharply. In the vicinity of the papilla the choroidal vessels are sclerosed. There is a post neuritic atrophy of the papilla, and in the region of the macula clumps of densely black pigment are to be seen. Both the arteries (a) and the veins (b) are narrowed, the former extremely so.

tuberculin both as a diagnostic and curative measure many obscure chorio-retinal lesions have been found to be of tuberculous origin. They occupy the posterior portion of the eye-ground while syphilitic lesions occupy, for the most part, the anterior. Recent lesions are seen as raised grayish spots which represent the edematous retina overlying the choroidal tubercles. Old cicatricies are usually of irregular outline, light in color and have more or less pigment within or encircling them. The pigment, however, is rarely as dense or black as in syphilitic lesions and choroidal vessels are never exposed.

Optic neuritis is to be seen in 25 to 30 per cent of cases of tuberculous meningitis. It can not be recognized as of tuberculous origin unless other evidences of the disease are present in the eye.

*Changes in the eye grounds due to certain intracranial lesions.*—Little need be said concerning the value of the ophthalmoscopic picture in cases of suspected intracranial lesions. Any disturbance which increases the intracranial pressure is likely to be accompanied by choked disk. Choked disk is present in over 80 per cent of brain tumors. The papilla in these cases is tremendously swollen; it appears to be enlarged and is raised considerably above the level of the retina. The veins are markedly engorged and tortuous and the arteries narrowed. The papillary edema is striated radially and here and there a spot of white exudate or hemorrhage may be seen.

Tumors of the cerebellum or cerebello-pontile angle are most frequently accompanied by choked disk, those of the frontal lobe of the cerebrum and of the hypophysis, least often.

The intracranial conditions most frequently responsible for papilledema in children are

acute and chronic meningitis, hydrocephalus, and tuberculosis.

Papilledema is often the earliest positive sign of brain tumor. It behooves us, therefore, to examine the eye grounds in every case where the patient complains of persistent headache.

### CONCLUSIONS

In closing, let me say that the ophthalmoscopic picture is frequently the first sign that points the way to a correct diagnosis.

It is of value in prognosis, with reference especially to albuminuric retinitis and to certain types of arteriosclerosis of the retinal vessels.

Finally, no examination of a patient for evidences of systemic disease, and particularly for evidence or extent of generalized vascular degenerative changes, is complete without a study of the eye grounds.

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## NASAL ACCESSORY SINUS INFECTION*

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Foci of infection situated in the teeth, tonsils or appendix being quite accessible, are most readily detected and removed. Foci in the paranasal cells are many times overlooked and their part in producing general systemic disturbances such as headaches, neuralgias, neuroses or eye disorders, may be lost sight of.

Anatomically the paired sinuses frequently lack symmetry, and on transillumination a dark sinus may be due merely to lack of development. A really typical sinus formation has been the exception rather than the rule in patients presenting themselves for examination. Because the paranasal cells are anatomically irregular and topographically concealed, the difficulty of diagnosis and treatment arises. Several anatomical and physiological conditions must be considered in studying these infections.

Normally, self drainage is established through the action of the ciliated epithelial lining which carries secretions through the normal ostia; intranasal obstruction, like deflection of the septum, hypertrophy of the turbinates and nasal mucosa, or neoplasms and polyps, interfere with drainage. The frontal sinus is the only one which has constant gravity drainage when the body is erect, the ethmoids only occasionally, while the maxillary and sphenoid sinuses are located so that they have gravity drainage only when in certain recumbent positions.

Because of the nasal passages being subject to frequent inflammatory attacks and the close relationship between the mucous membrane and periostium, structural changes in bone and soft parts result. This matter is one of great importance because it bears upon one of the most important phases of treatment, namely, drainage. Sluder, White, Smith and others have called attention to the action of osteoblasts under pathological stimulation; in some cases, bone salts are precipitated causing hyperplasia, while, in others, bone salts are absorbed and an atrophic condition results. Both conditions may be present in the same case and account for the distortions in the nasal cavity which one frequently sees. Sinusitis is due to bacterial invasion. Toerne demonstrated that the mucous secretion has a marked inhibitory action on anthrax bacilli even though it does not possess any special bacteriocidal power.

In an infection of the sinus, therefore, both the ciliary action and the inhibitory property of the secretion to the growth of bacteria must be overcome. Lowered vitality of membranes and direct bacterial invasion are combined causative factors, but Killian has shown that infection will also develop through the blood and lymph channels. Pus under tension and away from oxygen is more virulent than that exposed to air.

The bacterial causes most frequently encountered are: the influenza bacilli, pneumococci, staphylococci, streptococci, colon bacilli and diphtheroid bacilli. Recently the most frequent infections can be laid to influenza.

The invading bacillus causes inflammation and swelling; lymph and leucocytes are thrown off and there is pus formation. If the ciliary action of epithelium is not sufficient and the ostium is closed by swelling in its lumen or by nasal swelling and obstruction, stagnation, retention and mixed infection with permanent changes in the mucous lining are the result. Such changes may

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assume the form of granulomata, polypoids or fibromata.

Skillern draws the following conclusions:

1. Pathogenic micro-organisms are never present in normal sinuses, the mucous membrane being able, under ordinary conditions, to render inert and expell the germs.
2. The primary or infective germ may disappear, allowing germs of secondary infections to continue the disease.
3. Pure cultures of one variety are seldom found in suppurative sinus infection.
4. The most common organisms found are staphylococci and streptococci, but four or five separate micro-organisms may be found in the same culture and it is impossible to state which was the primary infector.
5. In continued cases the type of organism may change and recurrences be of different bacterial origin.

Several distinct methods of infection may occur:

1. Direct infection by pathogenic bacteria.
2. Extension of inflammation and infection from neighboring parts (abscessed teeth).
3. As result of tuberculosis, syphilis, malignancy or latent empyema.
4. Through blood and lymph channels.
5. Through traumatism and exposure.
6. Through foreign bodies. (Dental drill or unerupted tooth).
7. Through extension from other sinuses.

When there has been a destruction of the mucous membrane in these cavaties it is not likely to be entirely regenerated, as the blood and lymph supply is not profuse. These infections are usually walled-in processes and produce local symptoms such as neuralgia; they are not as likely to show general systemic signs as do tonsils and abscessed teeth, unless necrosis has set in and the physiological wall has been broken down. The sphenoidal and ethmoidal sinuses, deriving their blood supply largely from the mucosa, are more subject to necrosis of the bone than are the antrum and frontal sinuses. For that reason they cause more constitutional phenomena. One half of the wall of the orbit adjoins sinuses and many eye conditions are associated with sinusitis. Recurrent iritis, iridocyclitis, oculomotor paralysis, ophthalmitis and orbital cellulitis are the most common.

Unless relieved early before structural changes have occurred and when there is still a possibility of regeneration of the mucous tissues, purulent sinusitis or empyema cannot be considered cured even after radical surgical measures. The best that can be claimed is that the disease is arrested. A sinus, even after radical operation, is more liable to reinfection than a normal sinus is to an original infection.

Complications of sinusitis are common, due to anatomical relationship. The veins of the frontal sinus anastomose with the large longitudinal sinus; ethmoidal veins empty into the superior and inferior ophthalmic veins and anastamose with the veins of the dura; sphenoidal veins anastomose with the cavernous sinus. Besides, defects in sinus walls are not uncommon.

To establish a diagnosis it is necessary to take into consideration the clinical symptoms, besides using transillumination and x-ray. A general malaise or the rheumatoid aches and pains usually attributed to dental and tonsillar infections may be the only symptoms. We must not overlook a sinus focus in nephritis, gastric ulcer, in various eye infections, migraine, neuralgias and neuroses, even though there are no local sinus symptoms present. In luetic patients symptoms laid to the disease itself may have their seat in an infected sinus. Transillumination is useful only in marked antrum and frontal sinus involvement and is useless in ethmoid and sphenoid cases. X-rays should be taken in all cases and even then expert interpretation of plates is necessary.

Mere nasal inspection is usually useless on account of the swelling of the mucosa and the tissues must be shrunken and suction used in order to determine the origin of the pus. Treatment of sinus infections therefore depends on many conditions. Some cases may be treated expectantly while others demand prompt and radical procedures. Much depends upon whether the case is acute or chronic. The engorged mucosa is shrunken with adrenalin and cocaine (10-20 per cent) and the origin of the pus and secretions noted. If none shows apply suction and inspect again.

In acute cases two things must first be done: the patient must be kept comfortable and the inflammation allayed. After using cocaine and adrenalin locally, copious hot saline irrigations relieve some cases. Inhalation of Menthol drams 1, Comp. Tr. Benzoin ounces 4, one half ounce in one pint of water is useful, as is heat with electric light bulb, and sweating. Direct irrigation is contra-indicated in acute cases. If heat does not relieve, cold sometimes will.

In chronic sinus disease the end in view is to establish drainage and to regenerate the sinus mucosa. To enlarge the sinus ostia by relieving intranasal obstruction from polypi, turgescent and hypertrophic tissue or deviated septum is the first surgical measure to be adopted in any case. When a series of cells are affected, like the maxillary antrum with the ethmoids, drainage of the antrum alone frequently clears up the ethmoid involvement. An intranasal operation on the antrum (like Dahmer's), is usually sufficient. Skillern describes a preturbinal operation which permits inspection of the cavity with an ear speculum, but the opening closes up quickly and drainage is not permanent. A combination of this and a method used by Dr. Faulkner of the Manhattan Hospital gives permanent drainage. The mucous membrane and periosteum is elevated to the floor of nose and after the bony partition has been removed and the antrum curretted the flap is laid onto the floor of the antrum. Caldwell-Lucs or Denkers operation are required when there is much granulation tissue. For frontal empyema I prefer Lathrop's operation to Killians'. In the former the septal partition from sinus to nose is removed and little disfigurement results.

DISCUSSION

DR. H. I. LILLIE, Rochester: Accessory sinus disease has always been an interesting subject because the last word has not been said. Personally, in any questionable case, I would not care to make the statement of involvement of the sinuses without the privilege of examining the case several times. The clinical findings, the history, and roentgenograms are features to be considered. The variations as shown in the slides must be recognized in attempting to make a diagnosis. A previous sinus involvement so thickens the periosteum and sometimes the bone as to form shadows in the roentgenogram. This must be considered. Schleich has gone so far as to say that in certain cases he should not render an opinion without the privilege of having seen the case, sometimes as long as three weeks. In accessory sinus disease there is no question but what frequently the cause is some focus of infection. The search for foci must not be left to the ear, nose and throat man. Too often in our enthusiasm of focal infection, if the teeth, tonsils, and accessory sinuses are negative sufficient search is not made thereafter.

The treatment of accessory sinus disease in the early stage is important. As brought out by Dr. Schlesselman, very little should be done in a surgical way because there is considerable danger attending operation. Recently one man stated in a Copenhagen medical journal that puncture of the antrum was not unattended with danger. It may produce a spasm with a secondary effect on the phrenic and vagus nerves. I proved this by closing off the trachea in a Belgian hare, and found the intratracheal pressure was very much increased over the normal following the injection or manipulation within the antrum. So it is apparently reflex. Surgical procedures in cases of acute infection of the antrum may spread infection and drive the blood supply towards the cribriform, resulting in meningitis. It is far better, unless there are severe symptoms, to let the acute antrum resolve under local measures, as outlined by the essayist.

In the management of chronic sinusitis, I am in accord with Coakley and Eggleston and other experts that certain cases require drainage, and certain other cases require operation. The drainage can usually be readily carried out intranasally. In the very severe cases that present themselves, nothing short of radical operation seems to accomplish any results, and I think the tendency in these severe cases is to err more on the side of conservatism than on the side of radical operation. The ultimate results, as far as relief of symptoms is concerned, can be accomplished satisfactorily in the majority of such accessory sinus cases. The results cannot be had in one or two weeks. It is only fair to tell these patients how long it is necessary for them to be under observation, but there is certainly a good chance for them to be relieved. It is the consensus of opinion of many men doing ear, nose and throat work that we are on the threshold of knowing something about accessory sinus disease.

DR. HORACE NEWHART, Minneapolis: I wish to heartily concur in what has been said by Dr. Schlesselman and Dr. Lillie as regards the difficulties of diagnosis of sinus disease in general, and I would like to call attention to some recent experience of the difficulties in recognizing these cases of dental origin. Here the x-ray is not frequently definite, and we have had several surprises on opening the sinuses in the performance of the radical operation. This I think is justified in some of these cases which are indefinite, and particularly where the patient is suffering from the remote effects of focal infection which has not been recognized. Along this line, although I may be premature in expressing myself, I would like to

call the attention of those present who are doing eye, ear and nose and throat work, also the general practitioner to the not infrequent remote effects of sinus involvement upon the eighth nerve. Being particularly interested in otology, we make a routine examination to determine the functional acuity of the hearing both before and after sinus cases. In quite a number of instances we find that without other treatment people who complain of tinnitis or other ear symptoms show marked amelioration after the sinus difficulty has been cleared up. This is suggestive, but I think those of you who follow the work as regards the more frequent examination of the ear and testing it for functional acuity, will be able to confirm my statement.

DR. C. A. LESTER, Winona: From the standpoint of one who does eye, ear, nose and throat work, we will occasionally have people referred to us with the statement, "Please examine the eyes, doctor. He had headaches." An eye headache generally comes on either spontaneously at any time from chronic eye strain or after the use of the eyes for close work. Patients come in any say, "I have a headache every day. I have it when I get up in the morning, and after I am up and stir around my headache is bad, but after a few hours it gets better." I tell these patients that their headaches are probably not brought on by the eyes alone, and possibly not at all, but are more probably due to nasal trouble than to ocular trouble. Such headaches are frequently due to focal infection or to involvement of the nasal accessory sinuses.

## COMPARATIVE VALUES OF THE ANTI-SYPHILITIC DRUGS*

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The arsphenamines are established as drugs of choice—in fact one might say of first choice—in the therapeutic regime against syphilis. As chemo-therapy has advanced, various arsphenamines have been elaborated with a resuting confusion. From a purely clinical experience it is most difficult to assign to each member of this group its relative position. Since salvarsan and neo-salvarsan are so well known, I shall only mention them.

*Arsphenamine* (salvarsan) may be looked upon as the mother salt. Its therapeutic efficiency is well known. There is no question that arsphenamine has a marked effect upon the visible lesions of syphilis and that it is well tolerated and produces no marked clinical sequelae in the majority of instances. Recent studies show that therapeutic doses do produce microscopic lesions in the kidney, liver and brain, which, however, as I have said, in the majority of instances are negligible, clinically.

The greatest objection to arsphenamine has been the rather troublesome mode of neutralization and the dilute solution required.

The next drug of the series which has been extensively used, is neo-arsphenamine. Neo-arsphenamine is not arsphenamine in convenient form. It was produced as a salt which was ready for use on solution without neutralization and could be used in concentrated solution, thus making intravenous injection with a small syringe possible. Its toxicity is lower, while its therapeutic effect is at least almost on a par with arsphenamine. The immediate reactions are probably a trifle more frequent and remote accidents such as dermatitis and icterus occur with approximately the same frequency as with old salvarsan.

*Sodium arsphenamine* is the disodium salt of arsphenamine and was produced in order to offer the physical and therapeutic features of arsphenamine in convenient form. No claim for superiority for this drug has been made, the advantage lying in its physical properties. It, however, chemically differs decidedly from alkalinized arsphenamine.

We have recently completed a careful study of 545 injections of sodium arsphenamine on 66 patients with active lesions of syphilis. From this experience and review of the literature, we concluded;—

That sodium arsphenamine is a readily soluble, easily administered, safe and efficient preparation. We employed a rather small dosage. Three tenths of a gram of the drug produced marked effect upon active visible lesions in males of approximately 150 pounds. From our observations, we believe that 0.45 is a safe and efficient average dose and although we employed as high as 0.6 Gm., this size was not found to be as well tolerated as the smaller doses. The solvent was sterile distilled water using from 10 to 20 c. c. for each dose. We encountered no reactions which we attributed to the contentrated solution.

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Sodium arsphenamine was administered in short intense courses 0.3 to 0.6 Gm. daily for three doses. Average doses 0.45 Gm. were administered at a five day interval for six doses and rather large doses (0.6 Gm.) were injected at a weekly interval for eight doses, according to the exigencies of the case. In no instance did we note untoward results which we thought were due to the interval.

Sodium arsphenamine exerts a marked influence upon the clinical manifestations of lues. This effect is not as rapid as that observed when arsphenamine or neo-arsphenamine are employed, the dosage employed being equivalent.

We most emphatically believe that sodium arsphenamine courses should be supplemented with mercurialization. In a few cases we employed sodium arsphenamine alone and allowed a long period of rest. Relapses both clinical and serological were noted.

Sodium arsphenamine exerted about the same effect upon the Wassermann as the other arsphenamines.

*Silver arsphenamine* was suggested by Ehrlich and elaborated by Kolle, who experimented with combinations of the various heavy metals and the salvarsan molecule. He gives the following table which shows that silver salvarsan has a more profound effect on experimental syphilis than any of the other members of the salvarsan group.

| | Dose | | | | Spirochetes Disappeared in |
|---|---|---|---|---|---|
| Old Salvarsan | 0.01 | Gm. | per | Kilo | 72 hours |
| Neo " | 0.015 | " | " | " | 48 " |
| Copper " | 0.004 | " | " | " | 96 " |
| Gold " | 0.005 | " | " | " | 48 " |
| Platinum " | 0.005 | " | " | " | 48 " |
| Silver " | 0.004 | " | " | " | 24 " |

Kolle concluded from his work that silver when combined with the salvarsan molecule forms a combination which has a greater spirochetocidal action than any other combination with which he worked. He thinks that silver salvarsan acts upon the syphilitic process in a two-fold manner, the salvarsan molecule exerting its well-known spirochetocidal effect, while the presence of the silver radical seems to inhibit the growth of spirochetes by stimulating the defense mechanism of the body cells. Therefore, he thinks silver salvarsan acts in combination.

After a careful survey of the literature and after the use of 250 ampules, we feel that we may safely state that silver arsphenamine is an efficient spirocheticide which has a pronounced effect upon the visible lesions of syphilis.

Silver arsphenamine is a dark brown salt. It is readily soluble in sterile distilled water but its color makes it impossible for undissolved particles to be seen. It is, therefore, safer to filter the solution before use.

The therapeutic dose is one-third that of arsphenamine. Most observers believe that the initial dose should be small, 0.05 Gm. to 0.1 Gm. and that 0.2 Gm. to 0.25 Gm. is the best average dose. The drug may be administered at short intervals (3-5 days) or one may lengthen the interval to a week and administer 12 to 15 doses. Prolonged courses have been employed in neuro-syphilis, accumulative effect rarely having been noted.

Immediate reactions are seldom encountered, while few cases of retarded reaction (dermatitis, icterus, etc.) have been reported. No authentic case of agyria has been observed. The effect on the Wassermann is on a par with the action of the other arsphenamines on this phenomenon.

One decided advantage of silver arsphenamine over the other members is the fact that the patient does not sense the characteristic garlic or other odor which is so disagreeably present during administration of the other arsphenamines.

### COMMENTS

As yet no conclusive work has been done which accords superiority to any member of this group of drugs.

In attempting to classify the various drugs, one must consider first, which drug has the most profound effect on the visible lesions of syphilis and can be given with the least danger to the patient.

In our own experience, arsphenamine and neo-arsphenamine have about the same action on lesions which may be compared, occurring in individuals of about the same general constitutional characteristics. We believe that

retrogression has been slower with sodium arsphenamine and silver arsphenamine. We are certain that mucous membrane lesions have been quite resistant to silver arsphenamine. However, the number of cases observed under sodium arsphenamine and silver arsphenamine is much smaller so that one might be inclined to compare the outstanding good results with the older drugs, with the poor results of the newer ones.

The painstaking pathological studies made on animal subjects receiving arsphenamine and neo arsphenamine conclusively show neo arsphenamine to be the less toxic.

Silver arsphenamine has been given in long continued courses and has probably been better tolerated when so employed than when the other members of the group were used over a long time. This very likely is due to the much smaller therapeutic dose.

The effect of all of the anti-luetic remedies in their action on the Wassermann reaction is variable. The personal factor must be considered, and since the same individual cannot receive two drugs under precisely the same circumstances (age of infection, etc.) it is utterly impossible to make an accurate comparison.

Nothing conclusive has been published to show that any member of this group of drugs possesses a selective action on any particular type of syphilis (cutaneous, osseous, neuro, etc.).

We believe that in all arsphenamine courses the patient must be carefully watched and questioned for early warning symptoms on the part of the organism against further amino-arsenicals and that the slightest significant symptom should cause the operator to delay subsequent injections in order to avoid grave accidents such as dermatitis, icterus, etc.

Until more evidence is at hand we most emphatically urge that mercury be used in connection with courses of any of the arsphenamines.

In conclusion we must warn against over enthusiasm for any particular drug or regime of treatment. Future therapy may be along the lines of organic therapy in preference to the use of heavy metals.

## THE CHILD'S PLACE IN THE TUBERCULOSIS CAMPAIGN*

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As we look back over the campaign conducted against tuberculosis we have to admit that the results have not been what was at first anticipated. Much has been accomplished but the better the disease is understood the more we realize that there is much to be done before a great reduction in the death rate can be expected. At first it was thought that if institutions could be built to care for the clinical cases of tuberculosis developing in the adult the time would soon come when it would be eradicated. Those needing treatment or the difficulty in discovering them was not realized. The time required to bring an active case to a stage of arrest was greater than was at first anticipated. Many more beds and institutions were needed than could possibly be provided and it was early recognized that many, in fact the bulk of the clinical cases would have to be treated in the home. Our efforts have been mainly directed toward taking care of the clinical case and very little attention has been given to those he may have infected unless they also became actively diseased. In other words the child though infected has had little consideration. Time and money have been spent in an effort to cure the disease and its prevention has been largely neglected.

Our best authorities tell us that from 70 to 90 per cent of the human race is infected with the germs of tuberculosis before they reach the age of fifteen years and that practically every one before adult life. If this is true and there is abundant evidence to prove it, infection is much more common than clinical tuberculosis since only about 10 per cent develop it in a clinical form. It is this 10 per cent which offers the problem and needs to be cared for before the disease becomes active.

There are many things about tuberculosis we do not understand. Probably the most important of these is a knowledge of what protects those 90 per cent who do not develop clinical

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tuberculosis although they are infected. If we knew this the tuberculosis problem might be easily solved. You may reply that the resistance in one against the disease is better than in the other. That is true, but what is this resistance? Is it brought about by immunity as a result of a previous infection or is it due to something unknown with which one individual is fortunate enough to be endowed while the other is not. These are important questions and ones we hope will be settled in the near future. If it were possible to establish definitely why one individual does not develop clinical disease and why the other does we could probably develop in the individual lacking protection what is needed to carry him safely through life without becoming actively diseased with tuberculosis. No doubt immunity either as a result of an earlier infection or inheritance plays a greater part in the prevention of clinical disease than has been previously acknowledged. Tuberculosis developing in a family when others have recovered or had the disease in a very chronic form usually offers a favorable prognosis while that developing in families with a negative history or when the resistance is poor usually offers a very unfavorable prognosis. Some families are protected or at least show more resistance than others. Weakness or resistance then appears to be more a family trait than that of the individual. It is evident that infection plays some part in protecting an individual by establishing at least a partial immunity. This has been recognized for some time by students of tuberculosis and efforts have been made to establish an artificial immunity but without uniform success. Work in this field offers opportunities but it is doubtful if it will be possible to establish a complete immunity.

Time of life when one becomes infected and amount of infection is also to be considered. The younger the child the greater will be the chance of the disease becoming active following infection. While the child may overcome a certain amount of infection and hold it in check a greater amount may overcome the resistance. He is fortunate who receives his infection in doses small enough to be able to control it for he is laying in store for himself a certain amount of immunity which may protect him later in life.

The optimist may say "prevent infection and you will prevent tuberculosis." Certainly if there were no infection there would be no tuberculosis. Theoretically this is true but if there were no infection there would be no immunity such as is possessed by one previously infected. If we could be sure of destroying all chance of infection we would be insured against tuberculosis. On the other hand there is no doubt but that the individual who carries a previous infection or an inherited immunity as a result of the disease in one of his ancestors has a better resistance than he who does not. This has been very clearly demonstrated by the resistance shown in the Hebrew race and the lack of resistance in the Indian and Negro when exposed to infection. The fact that one has been infected is not so serious as might be supposed. It may be an asset rather than a liability.

The chance of escaping infection is almost impossible but infection alone will not cause clinical tuberculosis. When clinical disease develops there are present both infection and a lowered resistance, neither of which alone can cause the disease. It is evident then that our best means of preventing the disease is to prevent infection and build up a resistance. The former is practically impossible as is shown by the number infected before reaching adult life. Time of life and amount of infection taken into the body at one time may be largely controlled. Every means possible should be exerted to prevent infection during the first year of life for the danger then is greater than later. During this period the child is protected to a certain extent for he remains where he is placed and if infected it is because infection is either brought to him or he is taken to it. While it is natural for the proud mother to want to display her baby it would be better if it were denied visitors and the privilege of visiting. This would limit its exposure to unknown cases of tuberculosis and spare the danger of infection. The baby should not be kissed by friends or relatives; certainly he does not appreciate it, and the risk is too great. After the first year the child gets more or less beyond control and will probably come in contact with infection since he moves from place to place, often going where he should not and placing all kinds of things in his mouth. The

danger of infection becomes greater as the child grows older but fortunately his resistance also increases.

Regarding the amount of infection, every effort possible should be made to limit it so that it will not overcome the resistance. The child, regardless of age, should not be permitted to live in intimate contact with an open case of tuberculosis. When there is an active case of tuberculosis and a child in the same house either one or the other should be removed, for it is practically impossible for an open case and a child to reside within the same walls without the latter becoming infected. Just what part milk plays in the infection of the child has not been definitely established. Until it has been proven that the bovine bacilli undergo a transition from the bovine to the human form after being taken into the body it can not be given credit for playing an important part in the causation of pulmonary tuberculosis. As a medium for transferring human bacilli from one individual to another it may be of more importance and for this reason no tuberculous person should handle milk.

The resistance and general strength of the child should be carefully looked after. Physical defects should be corrected, proper living conditions provided, acute diseases avoided as far as possible and when they do occur the child should be closely watched until he has entirely recovered. Home conditions should be looked into, and recommendations should include plenty of rest, regular hours and abundance of nourishing food taken at regular intervals. Every possible chance should be given the child to grow up strong and free from physical defects. When thus protected he will be able to hold infection in check and avoid disease.

A child exposed at any time to an open case of tuberculosis should be given special care for he is unquestionably infected. They should be kept under observation and made to live under the best conditions, preferably in a preventorium, when these can not be obtained otherwise. They should be trained in open air schools with hours of work limited to their strength. When given a chance most of them will grow up strong physically and mentally.

Special attention should be given to the child which is under par physically, in order that he may overcome his physical handicap. It is remarkable to see what improvement these children make when living under the proper conditions observing regular hours and getting sufficient and nourishing food. While these children are not suited for regular school work they do well when placed in an open air school with work adjusted to their strength. Many of them when working under these conditions show marked improvement and even though the hours of work may be limited to half that done in the regular school room the progress in the classes will be as rapid. He grows up healthy while being educated. The question may be asked why would it not be well to educate all children under these conditions. If they would continue to live under them after their education was completed it would be practical but since the majority would not the, results in the end would be better to educate the child under the conditions under which he will live. Those having been exposed to tuberculosis or who seemed predisposed by being under par physically, should continue to live a regulated life under ideal conditions to prevent a breakdown.

"If childhood is the time when infection takes place, it is the time when the one infected should be treated. If some one saw a lighted match lying in a pile of dry and inflammable material he would not stand idly by and say, 'let's see if it will ignite the building,' but would extinguish it at once. We are standing idly by the ignited match in the infected child waiting for the flame to start. Let us take care of the lighted match (infection) and not wait for the flame to develop in the form of active disease and when we do the death rate from tuberculosis will be lowered."

The child should occupy first place in the campaign against tuberculosis.

# THE INVOLVEMENT OF THE LYMPH GLANDS IN CARCINOMA OF THE LARGE INTESTINE*

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Carcinoma occurs more frequently in the large intestine, with the exception of the stomach and possibly of the rectum, than in any other part of the alimentary tract. DeBovis states that carcinoma of the large intestine occurs on an average of once in every 300 deaths, His percentages for carcinoma of the small intestine are 6.3, of the large intestine 44.5, and of the rectum 49.2.

Statistics collected by Brill show that of 3563 cases of carcinoma, only eighty-nine (2.5 per cent) were of the small intestine. Nothnagel found at necropsy in the Vienna General Hospital, that of 2125 patients who had died of carcinoma 243 had had carcinoma of the intestine. He also records that in 343 necropsies in cases of carcinoma of the intestine from the Pathological Institute of the General Hospital in Vienna, seventeen, less than 5 per cent, were of the small intestine; the remainder were of the large intestine. Hemmeter reports that of 5792 cases of carcinoma collected by various observers, 1296 were of the intestine. W. J. Mayo states that of 1264 cases of carcinoma of the gastro-intestinal tract in which operation was performed at the Mayo Clinic, between October 1, 1897, and November 1, 1911, 863 involved the stomach, fourteen the small intestine, 219 the large intestine, and 168 the rectum[20].

Nothnagel states that carcinoma of the large intestine is most common between the ages of 40 and 60. Most observers agree to this, but state that it may occur at any age and that it is quite common between the ages of 20 and 30. In sixty-six cases collected by DeBovis the average age was 42. The average age in most series seems to be considerably higher than this. Zuppinger cites a case of carcinoma in the sigmoid of a girl aged 12. Clar reported a medullary carcinoma in the colon of a boy of 3.

The disease seems to be slightly more prevalent in males than in females. Clogg reports fifty-five cases, twenty-nine in males and twenty-six in females. In DeBovis' series 53.9 per cent were males and 64.1 per cent were females. In Cumstom and Vander Veer's series 63.83 per cent were males and 36.17 per cent were females. Nothnagel believes, from his own experience, that there is little difference in relative frequency with which carcinoma occurs in the two sexes, but from the statistics he has collected from other observers it would seem that it is somewhat more common in males.

Statistics vary considerably with regard to the relative frequency of carcinoma in the different parts of the large intestine, but most observers are agreed that the sigmoid flexure of the large intestine proper is the most common site. Maydl reported forty-six cases of carcinoma of the large intestine from the Vienna General Hospital; thirteen of these were in the sigmoid flexure, six in the ascending colon, one in the appendix, and seventeen in the remainder of the colon. Nothnagel reports 118 cases also from the Vienna General Hospital; one of these was in the appendix, fourteen in the cecum, sixty-three in the colon in general, and forty in the sigmoid flexure. Bryant reports 104 cases; seven in the cecum, seventy-eight in the sigmoid, and nineteen in the remainder of the colon. Leichtenstern reports 109 cases; forty-two in the sigmoid, eleven in the descending colon, thirty in the transverse colon, six in the ascending colon, and twenty in the cecum.

Carcinoma of the large intestine begins in the crypts or glands of Lieberkuhn. Nothnagel states that the degeneration of glandular epithelium characteristic of carcinoma always begins at the fundus of the glands. The epithelium of the degenerated mucous glands then perforates the muscularis mucosa and the deeper tissues of the intestinal wall. According to Cole, when the carcinoma cells reach the intermuscular network of lymphatics they tend to progress around the bowel in the direction of these vessels, thus accounting for the frequency of the annular or ring carcinoma in the large intestine. The involvement of the lymph glands may take place as soon as the process reaches the lymphatic network of the submucosa, or it may take place

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through the intermuscular lymphatic net work.

The ordinary form of adenocarcinoma is perhaps found in every carcinoma that originates in the large intestine, but undoubtedly colloid carcinoma has a distinct entity and is present in a great many cases of carcinoma of the large intestine. The histogenesis of colloid carcinoma is still undecided. Hauser states that colloid carcinoma starts from the mucous membrane, but he does not state whether it is a product of local secretion or of degeneration. He believes that colloid carcinoma of the large intestine rarely produces metastasis in the other organs, but chiefly involves the serosa.

Metastasis, as a rule, develops very slowly in carcinoma of the large intestine, Maydl states that secondary metastatic infection of the lymph glands is comparatively so rare as to make the radical cure of carcinoma of the large intestine favorable. Clogg states that carcinoma of the colon in many cases is a local disease. In only six of forty-one cases that he traced to necropsy were there visceral deposits and these were in cases in which the symptoms were of comparatively short duration. The symptoms were noted for from two to six months, and the liver was involved in all cases in which the glands were involved. Symmers in his study of metastasis of tumors in a series of necropsies at Bellevue Hospital, pointed out the striking contrast between the low degree of malignancy, displayed by tumors of the stomach and upper intestinal tract. Of forty-six cases of carcinoma in the stomach, metastasis was found in 82 per cent, in each of three cases in the duodenum, and in only fifteen (46.5 per cent) of twenty-eight in the lower bowel.

Welsh states that carcinoma of the large intestine spreads by direct extension of the cancerous process and by dissemination of the cancer cells. Jamieson and Dobson have shown that the lymphatic drainage of the large intestine follows a certain orderly plan, and Clogg states that the dissemination of cancer of the colon proceeds on the same anatomic lines. Sherrill states that metastasis from carcinoma of the bowel seems to occur most often through blood and that the liver suffers most frequently from secondary deposits. McArthur calls attention to the fact that the portal circulation alone of all the venous systems seems to transport the infectious elements of cancer, and it is through this means that carcinoma so frequently reaches the liver from the large intestine. W. J. Mayo[21] calls attention to traumatic dissemination of malignant disease, especially during surgical operations. He believes that the infected thrombi in the derivatives of the portal vein are loosened and carried to the liver. Nothnagel calls attention to the fact that metastasis may be present with comparatively small growths and be absent with very large growths. MacCallum cites a case in which the primary mass in the colon was only 3 cm. in diameter, although a metastatic nodule in the liver reached about 22 cm. in diameter.

## MATERIALS AND METHODS

One hundred preserved specimens, which had been removed operatively in the Mayo Clinic, are the basis of this study. The specimens in the gross, the size, location, form, extent, and character of the growth, and the surrounding normal tissues were first studied. Photographs were then made of the specimens, one showing the growth from the mucosal side and the other showing a cross section through the center of the growth in the longitudinal axis of the bowel. The character and extent of the invasion of the growth into the submucosa, muscular coats, and glands were then studied. Sketches of the specimens were next made, showing the relative location and size of the growth, leaving space on the sketch on which to place the glands, which were to be dissected out, as nearly as possible in their relative positions.

The lymph glands were carefully dissected out. In order to obtain the smallest glands visible to the naked eye, all the gland-bearing tissue was teased out into thin layers, through which the light could be transmitted. In this manner very small glands could be detected. As each gland was removed, its location in the longitudinal and radical directions was recorded, as nearly as possible, on the sketch. In each case the drawing represented the estimated size of the gland. A section of the original growth was taken, and numbered 1, and each gland was numbered in its place at the time it was put in the sketch. The section of the original specimen and each gland was placed in a small phial, cor-

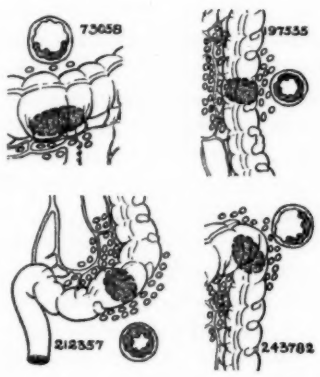
respondingly numbered and preserved in 10 per cent formalin; they were then sectioned, stained, and mounted for microscopic study. Any unusual or especially striking features were recorded on the sketch.

Printed diagrams were obtained of the ascending colon, hepatic flexure, transverse colon, splenic flexure, descending colon, and sigmoid flexure. A diagram representing a cross section of the bowel was also obtained for each specimen. The longitudinal position of the growth and its position on the circumference of the bowel were sketched. The glands were then sketched on the diagram, as nearly as possible, in the relative position in which they were found. There was no attempt to show the relative size of the glands on these diagrams as was done on the original sketches, but a few drawings were made of typical specimens, in which both the size and location of the glands were represented. On the diagrams, glands without any evidence of carcinomatous involvement were represented in solid black. On the diagram of the cross section the growth was represented as encircling the intestine or as on one or more of its walls.

RESULTS

The distribution by decades of the cases studied is shown in Table 1. Forty-two per cent of the patients were in the sixth decade. The average age was 52.31 years; the youngest was 21, and the oldest 76. Fifty-one were males and forty-nine were females.

Fourteen hundred six glands were obtained from the 100 specimens, that is, 14.06 glands for each specimen. In 63 per cent there was no metastasis; in 37 per cent one or more glands were involved. Very few specimens contained more than two or three involved glands, so that it was not considered necessary to make a third group corresponding to that in the series of McCarty and Blackford in their study of the glands of the stomach or that of McVay in his study of the glands of the rectum. All were put into two groups. In Group 1 were cases of carcinoma of the large intestine without metastatic involvement of the regional lymph glands, and in Group 2 cases of carcinoma of the large intestine with metastatic involvement of one or more regional lymph glands.




Figs. 1, 2, 3 and 4. Group 1. Diagrams showing relative position of glands and growths. The circles represent glands not involved.

A study of these two groups suggested Group 3, in which were placed cases of colloid carcinoma of the large intestine. This group was further divided into two sub-groups, cases of colloid carcinoma without metastatic involvement of the regional lymph glands and cases of colloid carcinoma of the large intestine with glands.

*Group* 1. *Carcinoma without metastatic involvement of regional lymph glands.* Sixty-three patients (63 per cent) were classified in

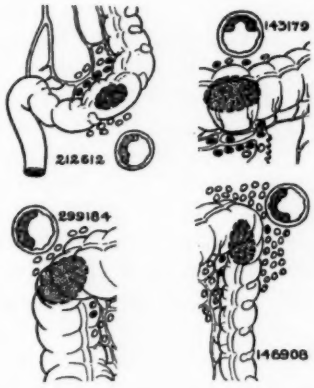
Fig. 5 (Case 184460) Group 1. Growth protruding into the lumen of the intestine, but not extending into the intestinal wall.

this group; thirty-one of the patients were females and thirty-two were males. The average age was fifty-two and one-tenth years. The average number of glands in each specimen was fifteen and four-tenths. While there were several specimens in which very few or no glands could be found, in the majority there were many large glands. Table 2 shows the sex, age, duration of symptoms, and the number of glands found in each case in this group. Representative diagrams of the glands and growths are shown in Figures 1 to 4. Figure 5 is a representative photograph of a specimen of this group.

McVay pointed out that the size of the malignant growth in the rectum bears no relation to the glandular involvement. Figures 1 to 4 show that the same holds true in carcinoma of the intestine. Nothnagel states that carcinoma usually encircles the lumen of the large bowel and in this manner produces obstruction. The encircling form of carcinoma was present in twelve of the sixty-three cases in this group. Figure 5 shows a marked protuberant growth from one wall of the intestine, which is characteristic of this type of case. Extension seems to be into the lumen of the bowel, rather than into the wall of the bowel. Extension into the muscle and fatty layers is not common.

*Group 2. Carcinoma with metastatic involvement of regional lymph glands.* There were thirty-seven patients (37 per cent) in this group. Nineteen were males and eighteen were females. The average age was fifty-two and twelve hundredths years, and the average duration of symptoms was ten and six-tenths months. The average number of glands in each specimen was sixteen and seventy-five hundredths. The sex, age, duration of symptoms, number of glands found, and the number of glands involved in each specimen are shown in Table 3. Representative diagrams of the glands and growths are shown in Figures 6 to 9. Figure 10 is a photograph of a typical specimen of the group.

As may be seen from the illustrations, the size of the growth bears little or no relation to the amount of glandular involvement. The ulcerative type of growth is more prevalent than the protuberant type which appeared more frequently in the cases in Group 1. In the thirty-seven cases there were nine of the napkin-ring




Figs. 6, 7, 8 and 9. Group 2. Diagrams showing relative position of glands and growths. The black circles represent glands involved.

or annular form of carcinoma. Many others had the appearance of the annular form because of a constricting ring following marked degeneration and resulting scar tissue on one or more sides of the bowel. In the cross section the tendency may be seen for the growth to extend into the muscle and fatty tissue surrounding the wall of the bowel. The carcinoma frequently extended to and involved other organs such as the bladder, ovary, and uterus. The diagrams show also that the gland or glands usually involved are those nearest the point of greatest direct extension of the growth. Occasionally a

Fig. 10 (Case 293388) Group 2. Extensive involvement of the intestinal wall and slight projection into the intestinal lumen by carcinoma.

large gland at this point appeared, macroscopically, to be carcinomatous; on microscopic examination it proved to be inflammatory, while one a little more distant proved to be carcinomatous.

*Group 3A. Colloid carcinoma without metastatic involvement of regional lymph glands.* There were eight patients (8 per cent) in this group. Five were females and three were males. The average age was forty and five-tenths years and the average duration of symptoms was five and six-tenths months. The average number of glands in each specimen was thirteen and two-tenths. The sex, age, duration of symptoms, date of operation, and number of glands found are shown in Table 4.

It has been stated by Hauser and others that colloid carcinoma does not metastasize. A study of this group seems to bear out this conclusion. Two of the six patients in the series of 100 without visible glands are classfied in this group of

Fig. 11 (Case 232689). Colloid carcinoma in a lymph gland.

eight, and, clinically most of the patients of this group show very mild malignancy.

*Group 3B. Colloid carcinoma with metastatic involvement of regional lymph glands.* There were eight patients (8 per cent) in this group. The average age was fifty-one and five-tenths years, and the average duration of symptoms sixteen and one-tenths months. The average number of glands in each specimen was twelve and five-tenths. The average number of glands involved was four and five-tenths. The sex, age, duration of symptoms, date of recurrence, the number of glands found, and the

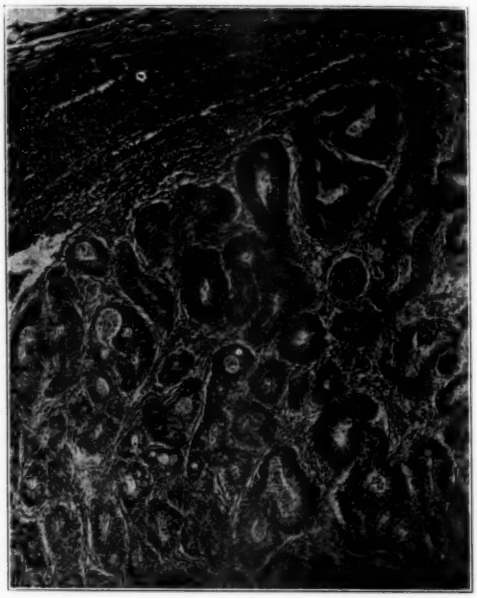


Fig. 12 (Case 248261). Extensive carcinomatous involvement of a lymph gland with a marked tendency to cell differentiation.

number of glands involved in each specimen are shown in Table 5.

The patients of Groups 3A., and 3B., are classified in Groups 1 and 2 as well. One thousand four hundred six glands were found in the 100 specimens of the entire series. Only ninety-five showed metastatic involvement; thirty-nine (41 per cent) of which were found in patients in Group 3B. In other words, 41 per cent of the entire number of glands involved were found in 8 per cent of the entire number of patients. In the clinical histories of nineteen of the 100 patients fairly definite evidence was established of recurrence within one and one-half years. Five of the nineteen patients were in Group 3B., thus 26.3 per cent of the total number of recurrences during one and one-half years fall in this group of 8 per cent of the total number of patients.

Case 187084 is an interesting example of

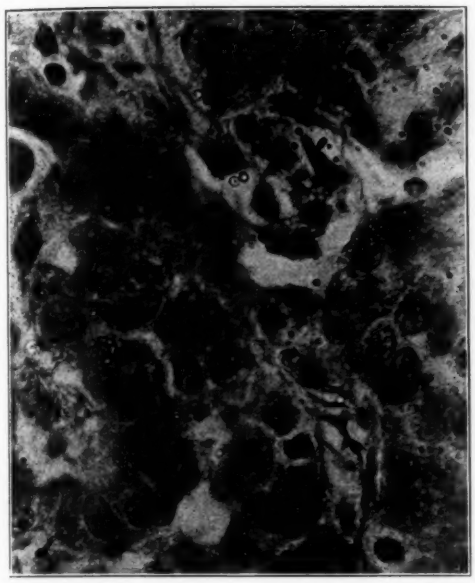


Fig. 13 (Case 143179). Metastasis in a lymph gland with very little tendency to cell differentiation. Large "one-eyed" carcinoma cells; some mitotic figures.

Group 3B. March 8, 1917, the patient had a resection of the stomach for carcinoma of the pylorus. October 13, 1918, she had a resection of the transverse colon for carcinoma. February 25, 1919, she had a recurrence in the abdominal wall, which was resected apparently to the outside of the growth. June 2, 1919, she died, apparently of an extensive carcinomatosis.

Broders has expressed the opinion that once colloid carcinoma has metastasized it is difficult to control. A study of Groups 3A., and 3B., tends to support this opinion. The duration of symptoms is comparatively short in Group 3A., while in Group 3B., it is very long in most cases (Tables 4 and 5.) Figure 11 shows extensive colloid carcinoma in a lymph gland.

Clogg believes that carcinoma of the large intestine is frequently a local disease. MacCarty and Broders have called attention to the fact that if the cells in the carcinomatous metastasis are differentiating, the carcinoma tends to limit itself. Figure 12 shows extensive metastasis in a lymph gland with advanced cell differentiation. The tendency to gland formation is evidence of cell differentiation. A marked contrast to this is shown in Figure 13, in which very little cell differentiation but marked destruction of tissue is visible. Under the high power lens the large one-eyed cells, undifferentiated carcinomatous cells, are seen with an occasional mitotic figure. This growth (Case 143179) proved to be highly malignant clinically. The patient was operated on October 10, 1915, for carcinoma of the transverse colon, only six months after the appearance of symptoms. At operation the stomach and ileum were found to be adherent. He died during March 1916, evidently from metastasis; necropsy was not performed. Ten of the fourteen glands found locally showed metastatic involvement, the highest proportion of glands involved shown in any specimen of this series.

Metastasis from carcinoma of the intestine, as has been suggested, may occur in the liver without local metastasis. In one case (Fig. 14) carcinoma was found in the liver, although no involved gland could be found locally. In one other case metastasis occurred in the liver without local metastasis, but in this case a number of large inflammatory glands were found.

Beginning metastasis in a large lymph gland is illustrated in Figure 15. The involvement is first evident near the periphery of the gland through the lymph sinuses. This fact has been

Fig. 14 (Case 248261). Metastasis in the liver.

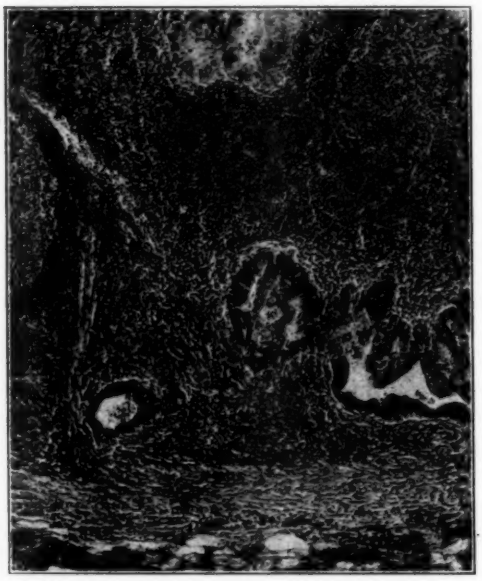


Fig. 15 (Case 187084). Early metastasis in a lymph gland.

pointed out by Billroth, MacCarty and Blackford, Zehnder, and McVay.

The statement has been made often that of growths of the entire alimentary tract, those of the large intestine have the lowest degree of malignancy. A study of this series seems to bear out this conclusion. MacCarty and Blackford found glandular involvement in 52 per cent of 200 cases of carcinoma of the stomach; McVay found 47 per cent in carcinoma of the rectum. In this series metastasis was found in only 37 per cent. The average number of glands involved in this series was also much smaller than in the series of MacCarty and Blackford and of McVay.

In the 100 patients of this series, the sigmoid flexure was involved in forty-two, the descending colon in twenty-one, the splenic flexure in seven, the transverse colon in sixteen, the hepatic flexure in nine, and the ascending colon in five. Diagrams representative of the series are shown in Figures 16, 17, 18 and 19, in order to emphasize the fact that the size or number of glands is not a criterion of metastatic involvement. The intestine is opened on the side opposite the growth, or in cases of annular carcinoma, through the carcinoma. In many cases the gland-bearing tissue posterior to the growth was cut in the middle and turned out to the sides, so that no glands are represented posterior to the growth itself. The glands are numbered in position as they were removed from the specimen, and in each case the actual size of the gland is represented as nearly as possible. Number 1 represents a section from the growth in each case. The glands posterior to the intestine which were not involved are represented by dotted circles; those which were involved, by circles with cross lines. The glands to the side of the intestine which were not involved are represented as clear circles, those which were involved, as black circles. Many very large glands, it may be noted, show no metastatic involvement, while some very small glands, which might easily escape palpation, show marked involvement. In Figure 16 are shown many large inflammatory glands, without metastasis, which to the naked eye or to the sense of touch seem volved glands. In Figure 17 are shown many glands with metastasis, practically all of which to be practically indistinguishable from the inare too small to palpate in the abdomen under ordinary conditions. Involved glands were not found at the time of operation, but the growth was extensive, piercing the intestinal wall and involving the bladder and ileum. This case from Group 3B. proved to be one of the most malignant. Figure 19 shows many large inflammatory glands and a very few carcinomatous glands. The size or position of the gland is of very little value in determining whether or not it contains metastasis. Figures 16, 17, 18 and 19 were selected as illustrations without thought of the case number, or the clinical history of the patient, but on investigation of the histories it was found that the two patients with marked metastasis lived but a short time while the other two, when last heard from, were feeling well and had gained 15 to 28 pounds respectively. The unusually large glands with metastatic involvement, illustrated in Figure 18, are a marked exception in this series.

A combined study of the clinical histories and the appearance of the growths suggest the following conditions for which the patients sought medical aid: (1) protuberant growths from one wall of the intestine into the lumen, producing obstruction; (2) the formation of annular car-

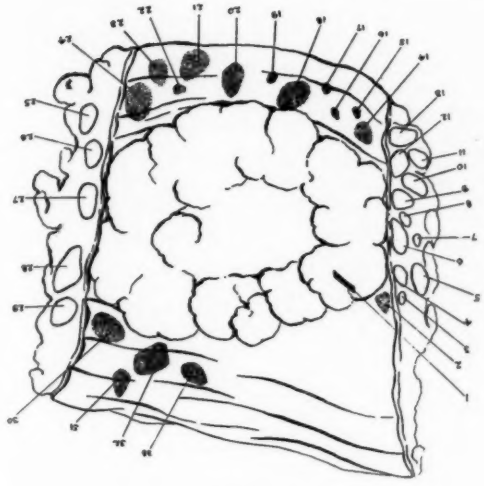


Fig. 16

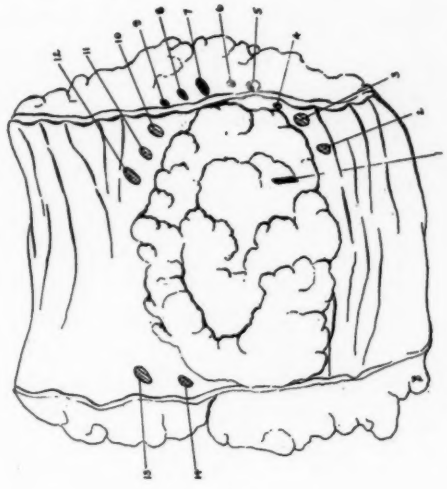


Fig. 17

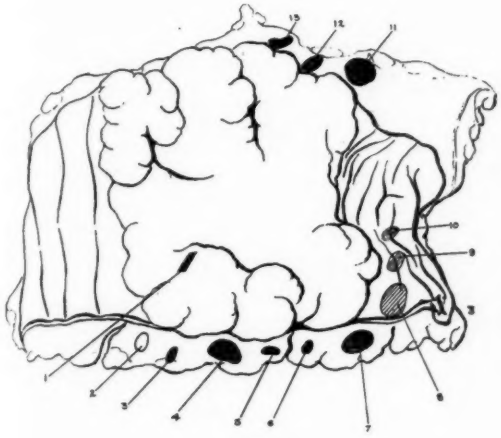


Fig. 18

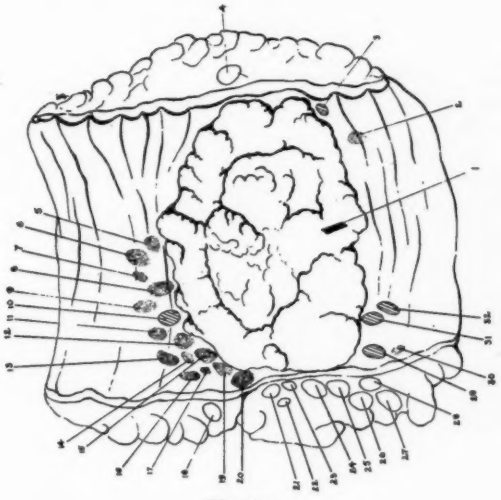


Fig. 19

Fig. 16 (Case 117846), 17 (Case 209414), 18 (Case 143179), and 19 (Case 143179). Drawings representing the size and position of glands and their relation to growth. Dotted circles represent glands without metastasis, behind the intestine; clear circles, glands without metastasis, not behind the intestine; circles with cross lines, Solid black circles, glands with metastasis, not behind the intestine.

cinoma, as described by McArthur, producing constriction and consequent obstruction; (3), ulceration of the growths in the lumen of the intestine, causing tenesmus, local pain, and blood and mucus in the stool; (4) extension of the growth through the wall of the intestine, and into other organs, complicated by secondary infection, resulting in pain and partial obstruction; (5) the weight of the tumor mass, causing distortion of the parts with consequent pain and interference with the normal peristalsis of the bowel; and (6) degeneration and formation of scar tissue producing constriction and consequent obstruction.

TABLE 1

Distribution by decades of the 100 cases of carcinoma of the large intestine

| | |
|---|---|
| 1 to 10 years | 0 |
| 11 to 20 years | 0 |
| 21 to 30 years (21, 26, 29, 29, 29) | 5 |
| 31 to 40 years | 8 |
| 41 to 50 years | 21 |
| 51 to 60 years | 42 |
| 61 to 70 years | 21 |
| 71 to 80 years (72, 75, 76) | 3 |

TABLE 2

Group 1. Carcinoma of the large intestine without metastatic involvement of the lymph nodes

| Case | Sex, Age | Duration of Symptoms Months | Glands |
|---|---|---|---|
| 209714 | F-50 | 4 | 15 |
| 139635 | M-63 | 6 | 16 |
| 284697 | F-55 | 12 | 13 |
| 243782 | F-38 | 11 | 31 |
| 286874 | M-67 | 12 | 17 |
| 243328 | F-50 | 8 | 0 |
| 256207 | F-42 | 3 | 12 |
| 256600 | M-56 | 14 | 26 |
| 270880 | M-58 | 2 | 18 |
| 117846 | F-32 | 12 | 33 |
| 311830 | F-75 | 6 | 12 |
| 339496 | M-64 | 6 | 0 |
| 321076 | F-50 | 12 | 21 |
| 321874 | M-21 | 4 | 0 |
| 335692 | M-64 | 9 | 28 |
| 312376 | M-46 | 10 | 28 |
| 296635 | M-57 | 12 | 18 |
| 213599 | M-37 | 12 | 28 |
| 203854 | F-56 | 6 | 0 |
| 215203 | M-76 | 36 | 0 |
| 261360 | F-50 | 12 | 5 |
| 73058 | M-40 | 12 | 11 |
| 324824 | F-58 | 18 | 15 |
| 243755 | M-49 | 2 | 21 |
| 245802 | M-40 | 2 | 28 |
| 245378 | F-56 | 5 | 11 |
| 248127 | F-49 | 7 | 26 |
| 263828 | F-50 | 1 | 8 |
| 182292 | M-58 | 7 | 7 |
| 314249 | F-62 | 14 | 14 |
| 265558 | M-46 | 8 | 17 |
| 212357 | M-65 | 12 | 37 |
| 268852 | M-62 | 6 | 20 |
| 289153 | M-64 | ? | 7 |
| 237533 | M-51 | 11 | 9 |
| 209460 | M-39 | 12 | 5 |
| 278586 | F-52 | 8 | 18 |
| 219689 | M-60 | 14 | 23 |
| 100279 | M-29 | 3 | 25 |
| 84262 | M-52 | 6 | 12 |
| 214608 | F-55 | 7 | 5 |
| 219038 | M-55 | 6 | 28 |
| 296853 | M-66 | 8 | 8 |
| 184460 | F-39 | 18 | 27 |
| 223299 | F-57 | 11 | 16 |
| 240539 | F-64 | 10 | 4 |
| 246503 | F-29 | 6 | 15 |
| 250035 | F-49 | 2 | 11 |
| 251195 | F-57 | 10 | 14 |
| 257681 | F-48 | 1 | 22 |
| 289835 | M-72 | 1 | 8 |
| 68010 | M-58 | 12 | 12 |
| 212902 | F-45 | 9 | 9 |
| 268339 | M-52 | 6 | 12 |
| 261807 | F-26 | 4 | 17 |
| 230039 | F-63 | 0 | 8 |
| 205274 | M-47 | 24 | 10 |
| 219381 | F-50 | 6 | 16 |
| 188149 | M-45 | 4 | 19 |
| 197535 | M-44 | 6 | 37 |
| 191500 | F-65 | 8 | 15 |
| 172055 | F-63 | 12 | 11 |
| 284368 | F-47 | 3 | 11 |
| | Females 31 | | |
| | Males 32 | Average 8.72 | 15.20 |
| Average age 52.1 | | | |

TABLE 3

Group 2. Carcinoma of the large intestine with metastatic involvement of one or more of the regional lymph glands.

| Case | Sex, Age | Duration of symptoms Months | Glands | Glands not involved | Glands involved |
|---|---|---|---|---|---|
| 225884 | M-35 | 2 | 13 | 12 | 1 |
| 290052 | M-67 | 3 | 15 | 14 | 1 |
| 262214 | M-52 | 17 | 7 | 10 | 7 |
| 293388 | M-50 | 12 | 3 | 1 | 2 |
| 68010 | M-56 | 12 | 13 | 10 | 3 |
| 289884 | F-42 | 12 | 7 | 6 | 1 |
| 232689 | M-49 | ? | 11 | 10 | 1 |
| 187449 | M-54 | 6 | 36 | 33 | 3 |
| 187304 | F-49 | ? | 10 | 8 | 2 |
| 299184 | M-50 | 24 | 12 | 11 | 1 |
| 209414 | M-54 | 12 | 15 | 2 | 13 |
| 212612 | M-46 | 18 | 15 | 10 | 5 |
| 248261 | F-54 | 8 | 12 | 10 | 2 |
| 228847 | F-50 | 6 | 15 | 14 | 1 |
| 212591 | M-60 | 12 | 16 | 15 | 1 |
| 212495 | F-29 | 2 | 7 | 6 | 1 |
| 294795 | F-56 | 2½ | 20 | 19 | 1 |
| 245141 | M-67 | 6 | 8 | 7 | 1 |
| 321367 | M-56 | 3 | 13 | 11 | 2 |
| 295180 | F-51 | 8 | 24 | 21 | 3 |
| 79425 | F-54 | 6 | 10 | 8 | 2 |
| 143179 | M-62 | 6 | 14 | 4 | 10 |
| 146908 | M-57 | 4 | 42 | 39 | 3 |
| 208521 | M-57 | 9 | 12 | 9 | 3 |
| 168215 | F-65 | 12 | 18 | 17 | 1 |
| 315878 | F-31 | ? | 18 | 14 | 1 |
| 297128 | F-48 | 30 | 14 | 13 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| 315119 | F-45 | 11 | 25 | 23 | 2 |
| 187084 | F-51 | ? | 18 | 11 | 7 |
| 90799 | F-58 | 30 | 15 | 13 | 2 |
| 129246 | F-57 | 6 | 32 | 27 | 5 |
| 329174 | F-52 | ? | 7 | 6 | 1 |
| 298031 | F-60 | 3 | 10 | 9 | 1 |
| 215439 | M-51 | 11 | 12 | 10 | 2 |
| 216233 | M-46 | 12 | 25 | 24 | 1 |
| 213582 | M-60 | 30 | 31 | 30 | 1 |
| 279654 | F-55 | 6 | 17 | 10 | 7 |
| Females 18 | | | | | |
| Males 19 | Av. | 8.33 | 16.75 | 14.16 | 2.56 |

Average age 52.1

TABLE 4

Group 3A. Colloid carcinoma of the large intestine without metastatic involvement of the lymph glands

| Case | Sex Age | Duration of symptoms, Months | Date of operation | Recurrence | Glands | Glands not involved | Glands involved |
|---|---|---|---|---|---|---|---|
| 100279 | M-29 | 3 | 2/14/14 | 0 | 25 | 25 | 0 |
| 223299 | F-57 | 11 | 3/ 1/18 | 0 | 16 | 16 | 0 |
| 245378 | F-56 | 5 | 9/25/18 | 0 | 11 | 11 | 0 |
| 263828 | F-50 | 1 | 4/14/19 | 0 | 8 | 8 | 0 |
| 209714 | F-50 | 4 | 10/ 6/17 | 0 | 15 | 15 | 0 |
| 243782 | F-38 | 11 | 1/ 3/19 | 0 | 31 | 31 | 0 |
| 339496 | M-64 | 6 | 11/ 5/20 | 0 | 0 | 0 | 0 |
| 321874 | M-21 | 4 | 6/ 2/20 | 0 | 0 | 0 | 0 |
| Females.. 5 | | | | | | | |
| Males.... 3 | Average, | 5.6 | | | 13.2 | 13.2 | |

Average age, 40.5.

TABLE 5

Group 3B. Colloid carcinoma of the large intestine with metastatic involvement of lymph glands

| Case | Sex Age | Duration of symptoms Months | Date of operation | Recurrence | Glands not involved | Glands involved | Glands |
|---|---|---|---|---|---|---|---|
| 209414 | M-54 | 12 | 10/ 5/17 | ? | 2 | 13 | 15 |
| 68010 | M-56 | 12 | 8/ 1/12 | 1½yrs. | 10 | 3 | 13 |
| 232689 | M-49 | 24 | 5/31/18 | 4/ 4/19 | 10 | 1 | 11 |
| 143179 | M-62 | 6 | 10/16/15 | 3/ 1/16 | 4 | 10 | 14 |
| 208521 | M-57 | 9 | 10/ 2/15 | 0 | 9 | 3 | 12 |
| 315878 | F-31 | 30 | 5/25/20 | 1/ 4/21 | 14 | 1 | 15 |
| 187084 | F-51 | 24 | 10/ 3/18 | 2/25/19 | 11 | 7 | 18 |
| 329174 | F-52 | 18 | 8/ 2/20 | 6/ 2/19 | 6 | 1 | 7 |
| Females.. 3 | | | | | | | |
| Males.... 5 | Average, | 16.1 | | | 8.85 | 4.87 | 13.12 |

Average age, 51.5.

CONCLUSIONS

1. Carcinoma of the large intestine occurs most frequently in the sixth decade, but it is quite common from the third decade on; it occurs about equally in both sexes.

2. Carcinoma of the large intestine metastasizes less frequently than carcinoma of any other part of the gastro-intestinal tract.

3. In this series of 100 cases metastasis occurred most frequently in the sigmoid flexure and in the other parts in the following order: descending colon, transverse colon, hepatic flexure, splenic flexure, and ascending colon.

4. Carcinomas without local metastasis usually protrude into the lumen rather than penetrate the walls of the intestine.

5. Carcinomas with local metastasis usually extend into the wall of the intestine rather than into the lumen.

6. Metastasis may occur in the liver without a sign of local metastasis.

7. Annular carcinoma is present in nearly 25 per cent.

8. Annular constrictions, due possibly to degeneration and resulting scar tissues, often have the appearance of annular carcinoma.

9. No definite conclusions were reached with regard to the relative frequency of the origin of the growth on the different walls of the intestine because of the marked inflammatory processes which complicated many of the growths.

10. Adenocarcinoma is present in every carcinoma which originates in the large intestine.

11. Colloid carcinoma occurs in about 16 per cent of the cases.

12. Colloid carcinoma seems to appear in two different types of cases, those with short duration of symptoms, or the mildly malignant type, and those with long duration of symptoms or the very highly malignant type.

13. Colloid carcinoma metastasizes and is frequently present in the most highly malignant cases.

14. Colloid carcinoma is very difficult to control after it begins to metastasize.

15. The highest percentage of recurrences is found among the second type of colloid carcinoma.

16. A very high percentage of local glands have metastasis in the second type of colloid carcinoma.

17. Carcinoma of the large intestine fre-

quently shows marked cell differentiation, and tends to limit itself.

18. Cases with little cell differentiation or without cell differentiation in the locally involved glands are frequently shown clinically to be more malignant than those with cell differentiation.

19. Lymph glands may be almost normal in consistency yet palpable and plainly visible to the naked eye.

20. Lymph glands may be only inflammatory, but with such marked cellular infiltration and lymphedema as to simulate large carcinomatous glands, both in size and consistency.

21. Carcinoma usually enters the lymph gland through the lymph sinus at the periphery of the gland, and in early involvement cannot be detected except by systematic microscopic examination.

22. The lower cut-off ends of the glands in the intestinal wall may be mistaken for highly differentiated carcinoma.

23. Very small glands, too small to palpate under ordinary conditions in the abdomen, may be carcinomatous.

24. Local glands with metastasis are usually at the point of greatest extension of the growth, but there are frequent exceptions to this.

25. In many of the more mildly malignant cases, without metastasis, the local glands are larger and more numerous than in the highly malignant cases.

26. In some instances local glands are not large enough to be visible to the naked eye.

27. Very few growths involve more than two or three glands in metastasis, but there may be a large number of large inflammatory glands in the same specimen.

28. Cases in which a large number of glands are involved locally usually show a high degree of malignancy clinically.

29. The size of the growth is no criterion of the presence or absence of metastasis.

30. Only by a systematic microscopic examination is it possible to rule out local metastasis in carcinoma of the large intestine.

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# THE USE AND ABUSE OF THE ELECTROCARDIOGRAPH*

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Less than twenty years ago, an instrument was devised by Einthoven which leads off the action currents of the heart and records them. American papers about these records were first written in 1910. Since this, the chapters on heart disease have been rewritten and the doctor's vocabulary has acquired new conceptions and new words.

What does the electrocardiogram mean?

Each time the heart beats, a current is generated, which is led off to the surface of the body. These currents are recorded by the electrocardiograph or string galvanometer by means of electrodes at the extremities of the body. There are three tracings in the standard electrocardiogram, known as Leads I, II, and III, because the currents are led off at the extremities, or as derivations (abbreviated D1, D2, and D3). The waves of the electrocardiogram show the passage of an impulse associated with the contraction of the heart muscle from the pacemaker up in the node in the right auricle, through the auricular muscle, along the conducting mechanism of the bundle of His, through the branching of this bundle to the two ventricles and then through the fine network of Purkinje fibres into the ventricular muscle. By measuring the length of the waves and intervals the normal time for conduction of impulses through the different regions of the heart has been found and deviations from the normal can be detected. For example, it has been established that it takes from .12 to .20 of a second for the impulse to pass from the normal pacemaker in the right auricle to the ventricle. A prolongation of that interval means either a lesion or a toxic condition in the conducting mechanism delaying the passage of the impulse. And so the tracing may show a partial block or a complete block of impulses between the auricle and the venticles; or it may show a delay of impulse to one or the other ventricle; or it may show a destruction of the finer network of Purkinje fibres going into the heart muscle itself. Each of these conditions gives characteristic signs on the waves of the electrocardiogram.

A few years ago it showed the pulsus perpetuus irregularis was caused by an incoordinate fibrillation of the auricles; that the pulse described as intermittent was usually caused by premature beats known as extrasystoles; that an extremely slow pulse with syncope was often due to complete heart-block. And so doctors can in most cases differentiate between the abnormalties in rhythm that are serious in prognosis and those that are of less importance; but there are occasional cases, usually obscure and indeterminate from clinical examination, in which the diagnosis can be made by electrocardiograph only, those in which the intricate myocardial structures, rather than the more easily accessible valve leaflets are involved.

1. The electrocardiogram may corroborate your clinical findings. You may be reasonably sure of your diagnosis of total irregularity, but it gives you a feeling of security to see a tracing showing the fibrillation of the auricle and telling you that digitalis should be used to control symptoms. You recognize premature beats clinically but you read on the electrocardiogram whether they arise in the auricle or in the ventricle. The auricular ones may be followed by more serious disturbances. The ventricular ones are commonly harmless. The electrocardiograph shows preponderance of one ventricle over the other and may help in differentiating between lesions of the left or of the right heart.

2. The electrocardiogram may amplify your clinical findings. You may find the ventricular extrasystole you were expecting but with it an auricular premature beat, too, making the condition more serious. You may find auricular fibrillation along with disturbances of impulse propagation in the ventricle. Uncomplicated auricular fibrillation has a low mortality (30 per cent in three years as compared with 47 per cent in all heart cases in a series reported by Paul D. White) while fibrillation associated with abnormal ventricular waves gave 100 per cent mortality in three years.

3. The electrocardiogram makes diagnoses in

*Presented before the Northern Minnesota Medical Association, Detroit, Minn., May 24, 1921.

important conditions not recognized by any other means. In delayed conduction between auricle and ventricle, the beat is regular and there is no clinical means of recognition. It means either a disease or a toxic condition of the heart muscle involving the conducting fibres. Digitalis may cause it and always has a tendency to increase it. This condition may become more marked and show as a partial block with dropping out of occasional ventricular beats, or as a complete block. Branch block is an interference with the conduction to one ventricle so that the impulse goes through the other ventricle. Arborization block is a delayed conduction through the Purkinje fibres going into the muscle itself. All of these conditions usually mean serious muscle disease.

Auricular flutter is a regular rapid rate of the auricle, usually at about 300. The ventricle cannot keep up with it and may beat at the rate of 150 or even 75. It is of extreme diagnostic importance and responds definitely to digitalis therapy. It can be discovered by electrocardiograph only. It should be suspected in every tachycardia not otherwise explained.

What is not shown by the electrocardiogram?

Heart sounds are not recorded and so valvular lesions cannot be determined except by the indirect evidence of left or right ventricle preponderance.

The size of the heart-beat or of the pulse wave is not shown. The size of the waves in the electrocardiograph depends on the flow of current. It is caused by the excitation wave that precedes the contraction and not the contraction itself. The size of the heart is not shown though relative increase of one ventricle over the other gives typical curves. If both ventricles are enlarged as in combined heart lesions, the usual relationship will be maintained and the tracing may appear normal.

Often there is a normal electrocardiogram in a patient with multiple valvular disease with enlargement of all chambers. But the conducting mechanism is unimpaired and the chambers are all enlarged equally. It is possible to have a serious muscle disease without showing signs in the electrocardiogram, probably because the path of conduction is spared. It should be remembered that a blocking of the impulse conduction may be a transient toxic condition instead of a muscle lesion.

How can the electrocardiograph be abused?

Accepting a normal electrocardiogram as positive evidence of a normal heart would be the same as accepting a negative Wassermann as evidence of no syphilis. On the other hand, an abnormal tracing may be due to a temporary condition. The heart may be irregular today and regular tomorrow.

To summarize:

The electrocardiograph should give you important information about a heart that is too rapid or too slow; about an irregularity of doubtful type; about a patient with heart symptoms but no demonstrable heart disease. Positive electrocardiographic signs of disease are of definite value. Normal tracings, however, do not necessarily mean a normal heart. For the electrocardiograph records only the events of impulse initiation and propagation in the muscle and the changes in position of the heart. Like all other graphic methods, it should be considered only as a part of a clinical examination. It gives information of heart muscle disease that you can find in no other way.

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# EDITORIAL

## MISDIRECTED ROUTINE*

Many hospital, laboratory and x-ray workers, will appreciate what is meant by useless routine: the misdirected conducting of certain tests or their repetition. This statement demands some explanation when hospital staffs are constantly being urged to provide diagnostic equipment, and then, through supervision of record system, to insist on its use. Doctors who have not been in the habit of utilizing laboratory procedures are apt to acquire an ungrounded confidence in their productiveness; to ascribe a finality to pathological findings that is unjustified. A wide series of negative findings cannot offset one definite, accurately observed and interpreted positive finding.

Somehow, the idea has evolved that good diagnosis simply demands the broadcast utilization of routine clinical laboratory and functional tests. This method is weighty, cumbersome and correspondingly ineffectual. Gold is to be found in a particular mountain—the surface and geological indications are favorable. Think of the senseless abuse of the miner's energy or the company's funds, that hurls the search at the mountainside with the crushing purpose of squeezing the treasure from its hiding place! Gold mining is mainly carried on by following leads and threads or viens, and many a bold and expensive shaft, aimed from overhead, with the hope of luckily striking a productive vein, has been sadly unavailing.

The interpretation of this illustration is more forceful when we analyze the course of an actual patient:

A busy, active, professional man, aged 58, had within a month the benefit of a thorough, routine examination, in an excellent hospital and under competent medical supervision. He was informed, and had a report substantiating his statement, that he was in splendid condition. A general physical examination, with roentgenological studies of the chest and gastrointestinal tract, together with a normal blood pressure, urine and blood, were said to indicate perfect health. Yet, within two weeks he began to have dizzy spells, and noted some tremor in his legs after exertion (golfing), and once noted some numbness and retardation in one leg. Following this thread of definite complaint, it is found that he had had a series of these dizzy spells off and on for six years; the elicitation of his family history shows that his father died at about 75 of progressive senility, with a dry gangrene affecting the toes of one foot. Despite his very abstemious life, careful eye fundus examination showed veins three times their normal width, with narrowed, tortuous, sclerotic arteries, and a roentgen picture of the ankle shows the delicate tracery of an atherosclerotic posterior tibial artery.

You may say that not enough routine was done in the first place; that the eye ground should never be overlooked. This may be so, but the case serves as a good illustration, because many patients are annoyed and some financially wrecked, by enthusiastic diagnosticians. We must get tangible results. Thousands of people send their urine at stated intervals to commercial laboratories, and get in return information that occasionally guides them well. But what of the overpowering majority that get a false sense of security because they feel that the urine is the all encompassing medium, that carries in it all the signals of impending disaster?

Normal blood pressures are the rule in intimal degeneration of the blood vessels, spoken of in the case here mentioned. Yet, behold the security of many individuals, who, like this man, accepted the congratulations of his examiners on this happy finding!

The lesson to be learned helps first in freeing our diagnostic laboratories of needless and misdirected work.

Don't rely on them for "pathognomonic" shortcuts to give us more time to pay homage to the God of laziness.

Let us stand back far enough from the patient to get the invaluable historical leads that properly start us on our search for definite data. Then, one step leading to another, let the search be unabating and unrelenting, even though it may happen to require the examination of the stools daily for a month.

If this is done, the laboratory workers will submit to less raillery and become diagnostic assistants, instead of crutches for clumsy clinicians.

E. L. T.

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*This editorial also appeared in Hospital Progress for November.

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## THE DEARTH OF TRAINED NURSES

That the shortage in trained nurses for private cases is on the increase has been noted for some time, particularly by the medical profession.

The ever broadening field of activities offered to the newly graduated nurse is in a large part responsible for this situation. Nursing is a noble profession, but, like the practice of medicine, it is a vocation.

Holding to the ideal exemplified by the first trained nurse, Florence Nightingale, is often difficult when one encounters certain phases of the profession which, to say the least, are inconvenient. The school nurse, tuberculosis nurse and nurse employed in any of the various industrial activities, works a specified number of hours and is through. Those associated with surgeons in their office, who constitute no small percentage of the total, have the same convenience as to hours. Marriage claims a very appreciable number in the years following graduation, but this has ever been true.

Recently proposed legislation would have included the nursing profession in the maximum eight hour labor law for women. This would have necessitated almost doubling the number training in hospital, and would certainly have complicated the private nursing proposition. A three years training course is admittedly a stiff test of a young woman's physical, mental and moral makeup, and should be and is awarded by a valuable diploma.

Because of the dearth of nurses there is a tendency to advocate lower requirements and standards in nursing generally. Short courses have been instituted, notably in Chicago, where more or less superficial training is concentrated and the product is entitled to do nursing. Some advocate lowering requirements for preliminary education so as to admit grammar school graduates and eliminating the so-called unnecessary scientific trimmings in the nursing course, claiming they are an encroachment on the province of the physician. They argue that this once accomplished, large numbers of highly competent women will flock into the nursing field.

There is no denying that less highly trained women could do equally well some of the work now done by the trained ones. One specially trained in a short course could care for the new-born fully as well as the three-year graduate nurse. Caring for chronic cases is still another instance. These less trained individuals should be distinctly more than the self-made practical nurse and could well be specialists in some particular branch of nursing, but need not demand a specialist's fee, nor, in fact, as high a one as the trained nurse.

This dearth of available trained nurses should certainly not be allowed to lower the standard of the profession known as trained nursing. The preliminary and training requirements should be raised to an even higher level than they are at present, so that the diploma will mean more to the possessor instead of less.

## THE NATIONAL BOARD OF MEDICAL EXAMINERS.

The need for National Board of Medical Examiners has been recognized for many years. The present Board was founded in 1915 and began its work in a small way. Its value to the young graduate depended of course on the number of states and countries that recognized its certificates, and also to the convenience as to the time and location of its examinations. Until recently the disadvantages accompanying the taking of these examinations largely outweighed the value of the certificate. We are glad to further publicity of the following announcement and believe the time is not far distant when every graduate will prefer to take this examination which will in all probability eventually remove all state barriers as to location for the practice of medicine.

"The National Board of Medical Examiners has just completed the first five years work and with it the trial period of its usefulness. The principle which this Board has stood for, namely, the establishment of a thorough test of fitness to practice medicine which might safely be accepted throughout this country and abroad, has been widely accepted. Since this Board was organized by Dr. W. L. Rodman, in 1915, eleven examinations have been held. These examinations have been conducted on the plan of holding at one sitting, a written, practical and clinical test for candidates with certain qualifications, namely a four-year high-school course, two years of college work, including one year of Physics, Chemistry, and Biology, graduation from a Class A Medical School and one year's internship in an acceptable hospital. These examinations have covered all the subjects of the medical school curriculum and have been conducted by members of the Board with members of the profession resident in the place of examination appointed to help them. Such examinations have been held in Washington, Philadelphia, New York City, Boston, Chicago, St. Louis, Rochester, (Minnesota) and Minneapolis. During the war a combined examination was held at Fort Oglethorpe and Fort Riley. There have been 325 candidates examined, of whom 269 have passed and been granted certificates.

Starting with the endorsement of the Council on Medical Education of the American Medical Association, American Medical College Association and various sectional Medical Societies, the recognition of the Army, Navy and Public Health Service Medical Corps of the United States and certain State Boards of Medical Examiners, the certificate is now recognized by twenty states as follows: Alabama, Arizona, Colorado, Delaware, Florida, Georgia, Idaho, Iowa, Kentucky, Maryland, Minnesota, Nebraska, New Hampshire, New Jersey, North Carolina, North Dakota, Pennsylvania, Rhode Island, Vermont and Virginia, the Conjoint Board of England, the Triple Qualification Board of Scotland, the American College of Surgeons and the Mayo Foundation of the University of Minnesota.

There has been such a wide-spread demand for an opportunity to secure this Certificate by examination, that the Board has now adopted and will put into effect at once, the following plan: Part I, to consist of a written examination in the six fundamental medical sciences: Anatomy, including histology and embryology; Physiology; Physiological Chemistry; General Pathology; Bacteriology; Materia Medica and Pharmacology. Part II, to consist of a written examination in the four following subjects: Medicine, including pediatrics, neuropsychiatry, and therapeutics; Surgery, including applied anatomy, surgical pathology and surgical specialties; Obstetrics and Gynecology; Public Health, including hygiene and medical jurisprudence. Part III, to consist of a practical examination in each of the following four subjects: Clinical Medicine, including medical pathology, applied physiology, clinical chemistry, clinical microscopy and dermatology; Clinical Surgery, including applied anatomy, surgical pathology, operative surgery, and the surgical specialties of the diseases of the eye, ear, nose and throat; Obstetrics and Gynecology; Public Health, including sanitary bacteriology and the communicable diseases.

Parts I and II will be conducted as written examinations in Class A Medical Schools and Part III will be entirely practical and clinical. In order to facilitate the carrying out of Part

III, subsidiary boards will be appointed in the following cities, Boston, New York, Philadelphia, Minneapolis, Iowa City, San Francisco, Denver, New Orleans, Baltimore, Galveston, Cleveland, St. Louis, Chicago, Washington, D. C., and Nashville, and these boards will function under the direction of the National Board. The fee of $25.00 for the first part, $25.00 for the second part and $50.00 for the third part will be charged. In order to help the Board the Carnegie Foundation has appropriated $100,000.00 over a period of five years.

At the Annual Meeting held June 13th, of this year in Boston, the following officers were elected, M. W. Ireland, Surgeon General, President; J. S. Rodman, M. D., Secretary-Treasurer; E. S. Elwood, Managing Director.

Mr. Elwood will personally visit all Class A Schools during the college year to further explain the examination, etc., to those interested. Further information may be had from the Secretary-Treasurer, Medical Arts Building, Philadelphia."

## NEWS OF THE HOSPITALS

New apparatus has been added to the clinical and x-ray laboratories of St. John's Hospital, St. Paul, and the nurses' class room remodeled and enlarged. Eight new nurses have recently entered the training school.

The staff of St. Joseph's Hospital, Brainerd, has recently been newly organized and the officers are as follows: Chief of Staff, Dr. J. A. Thabes; Vice Chief, Dr. W. B. Kelly, of Aitkin; Secretary, Dr. B. I. Derauf, of Brainerd. The latter is in charge of the offices of the Northern Pacific Beneficial Association opened in the First National Bank Building when the Northern Pacific Hospital was removed to St. Paul.

Drs. Plondke and Hilger, of St. John's Hospital, have recently returned from a hunting trip.

Realizing the increasing demand for nurses training in orthopedics and pediatrics the Minnesota State Hospial for Indigent Cripples and Deformed Children announces that they are now offering a course for post-graduates and affiliates. Course covers a period of from two to six months, especially emphasizing physiotherapy which plays so important a part in the treatment of infantile paralysis cases, orthopedic surgery, infant feeding, occupational therapy, dispensary and out-service department. The State Hospital is well equipped with all modern and up-to-date appliances and has a capacity of 200 beds. Each department is supervised by women who have had extensive training in their particular line of work. Nurses and hospitals interested may address further inquiry to the Superintendent, State Hospital, Phalen Park, St. Paul, Minnesota.

## OBITUARY

### CHARLES EASTWICK SMITH, JR.

The death, on July 30, 1921, of Doctor Charles Eastwick Smith, Jr., (better known to his many friends as Carl Smith) took from us one who was an example of a new type among medical men. Early in his professional career, he became interested and active in the broader aspects of medicine, maintaining this interest as well as active participation in public health work until his death.

Charles Eastwick Smith, Jr., was born in St. Paul, on January 15th, 1882, the son of Doctor Charles Eastwick Smith, and grandson of Doctor Franklin Smith who began his practice in St. Paul in 1855. Having received his elementary education in the public schools of St. Paul, Carl, at an early age, was sent to the Siglar School in New York state. His college preparation was made at the Taft School, Watertown, Connecticut, and his college work was done at Yale, where he received his B. A. degree in 1904. Returning to Minnesota in that year, he spent two years in the Medical School at the University of Minnesota, and then completed his work at the University of Pennsylvania, where he graduated in Medicine in 1908. After a year of internship at St. Joseph's Hospital, St. Paul, he began practice in this city in 1909.

Early in his practice, Doctor Smith began to do public health work, serving from the beginning of his practice for two years as Assistant City Physician. From 1914 to 1917 he held office in the St. Paul City Health Department, then transferring his activities to the State Board of Health, being at first Assistant Secretary, and later Executive Secretary of that body, which latter office he held until shortly before his death. He assisted largely in the installation of the Headquarters of the Fourth District of the United States Public Health Service which was established in St. Paul, early in the spring of 1919.

In June, 1909, he married Miss Esther McDavitt, daughter of Dr. Thomas McDavitt, of St. Paul, by whom he is survived. He is also survived by his son, Charles Eastwick Smith, III, two daughters, Esther and Mary, both parents, and one sister, Miss Mary Smith of St. Paul.

Doctor Smith joined the Ramsey County Medical Society in March, 1909, and served as its Secretary-

Treasurer from 1912 to 1917 inclusive. For practically this same time he was Managing Editor of the St. Paul Medical Journal, being the last incumbent of that office.

During his term as Secretary, the Society showed remarkable growth and more than once it has been remarked that in this period, the Society experienced a marked awakening of the interest which had formerly characterized its meetings.

In addition to his duties as Secretary-Treasurer and Managing Editor of the Journal, Doctor Smith found time to take an active interest in all proceedings of the Society. He was always interested in the library, and at the time when this was moved from the Lowry Annex to its present quarters, he was of great assistance in straightening out the confusion in which the material was found after it had been moved.

A clear and logical thinker, Doctor Smith had unusual ability to present a subject in a definite, clean-cut and concise manner. He was decidedly original in his mental processes. Interested in a great many things of many sorts, he had ideas and suggestions to make, of a variety which to most people was almost confusing. Many of his suggestions might prove on examination to be not feasible, but a large number of them proved to be of genuine merit. His acute mind, wide interest, and quick repartee were always a source of enjoyment to his friends.

Never of robust build, an attack of pericarditis which he sustained in 1911 appears to have impaired his heart. A condition of bronchiectasis and emphysema gradually developed, and although sanitarium treatment for several months in 1917 appeared to be of benefit, his activities during the last few years were seriously interrupted. Several attacks of pneumonia increased the gravity of his condition, and in the hope of betterment of health, some time was spent in the southwest, but without avail. The common impression that the cause of death was pulmonary tuberculosis is entirely erroneous.

In conclusion, we bear whole-hearted testimony to Doctor Smith's ability and sincerity. A man of positive opinion, it was inevitable that some should be unfriendly, if not at enmity, with him, but the same qualities which alienated a few, attracted many others.

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## ARCHIBALD CUNNINGHAM FAIRBAIRN

Archibald Cunningham Fairbairn was born in Brockville, Canada. After completing his studies in literary school, he studied medicine in Queens College, Ontario, in 1871, and Royal College Physicians and Surgeons, 1873. After graduation, he spent a year in post graduate work in Paris and London. Speaking French fluently, he greatly enjoyed his work in Paris. Returning, he located in Sacketts Harbor, N. Y. After a few years' practice there he moved to Minneapolis where he remained until his death. After two years practice he returned to Sacketts Harbor to marry Fannie Sackett, daughter of the late General Sackett. She was a woman of unusual culture and refinement. She died a few years before the doctor.

Dr. Fairbairn soon became one of the leading practitioners of the city, a man of fine presence and great culture. He served two terms as county coroner and organized that office on a business basis, and for the first time accurate records were kept. He served on the first board of medical examiners and for six years examined in surgery. He served on the board of directors of the Minneapolis Athaneum from its merging with the Public Library up to his death. He was noted for his kindness and sympathy with young doctors coming here to locate, and on holidays made it a practice to invite young bachelor doctors to dine with him at his home. Many of these men now grown old, speak of the appreciation and enjoyment they felt at such kindness shown them, some of them entire strangers of the doctor. He was a great student, possessed a fine library and kept abreast of the times by taking the leading medical journals. He joined the Hennepin County Medical Society soon after he came to Minneapolis and was faithful in his attendance on this as well as the State Society. He was secretary of the County Society for two terms and his minutes (now unhappily lost with all early records) were full and complete. His ethical standard was high at a time when ethics were largely ignored. He was a type of all-round practitioner before the separation into specialties. He was a daring and careful surgeon, performing one of the first laparotomies in this city. His skill as an obstetrician was recognized in the community and he enjoyed a large practice in this specialty.

Several years ago while doing an intubation in a case of diphtheria, Dr. Fairbairn had an infection from puncture of his thumb and was confined for months, and very nearly lost his life. He never recovered entirely, suffering from partial optic atrophy and neuritis. His death was due to carcinoma of the oesophagus and pancreas.

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Stanley H. Haynes, Minneapolis; Rush Medical College, Chicago, 1920; until July 1921, on the staff of the Lakeside Hospital, Cleveland; died, August 8, following an operation at the Northwestern Hospital, aged 28.

# REPORTS AND ANNOUNCEMENTS OF SOCIETIES

*SOUTHERN MINNESOTA MEDICAL ASSOCIATION*

The Annual Meeting of the Southern Minnesota Medical Association will be held at Mankato, Minnesota, December 5th and 6th, 1921.

The program will measure up to the high standard established by the Southern Minnesota Medical Association; the speakers who will present papers are:

Dr. N. Allison, St. Louis, Missouri, "A Study in Bone Atrophy."

Dr. A. W. Adson, Rochester, Minnesota, "Surgical Aspects of Neurological Surgery."

Dr. H. M. Connor, Rochester, Minnesota, "Serous Effusions of the Chest."

Dr. F. E. Leavitt, St. Paul, Minnesota, "Fifty Cesarian Sections."

Dr. C. J. Rowan, Iowa City, Iowa, "The Causes of Failure of Operations for Chronic Appendicitis."

Dr. C. R. Ball, St. Paul, Minnesota, "Psycho-Therapy."

Dr. J. C. Masson, Rochester, Minnesota, "Retroperitoneal Lipomata."

Dr. R. A. Barlow, Rochester, Minnesota, "Recognition of the Sphenopalatine Ganglion."

Dr. B. S. Gardner, Rochester, Minnesota, "The Dental Examination."

Dr. A. C. Baker, Fergus Falls, Minnesota, "The Treatment of Empyema."

Dr. W. G. Workman, Tracy, Minnesota, "Cystic Disease of Bone."

Dr. E. J. Huenekens, Minneapolis, Minnesota, "Some Simple Factors in the Health of Older Children."

Dr. E. Z. Wanous, Minneapolis, Minnesota. Title to be given later.

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The Minnesota Pathological Society of the University of Minnesota Medical School met Tuesday evening, October 18, 1921. Dr. E. L. Opie delivered the annual address.

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The fall meeting of the Upper Mississippi Medical Society was held at Wadena on October 11th. Papers were presented by Dr. Fred Adair, Minneapolis; Dr. Geo. M. Waldie, Todd County Sanitorium, and Dr. T. L. Davis, of Wadena.

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The Mower County Medical Society held their fall meeting at Austin, September 23rd. Dr. Frederick J. Plondke, of St. Paul, addressed the meeting.

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The fiftieth annual meeting of the American Public Health Association will take place in New York City November 8th to 19th, with headquarters at the Hotel Astor. This meeting will be conducted under the joint auspices of the Department of Health of the City of New York, and is expected to outstrip the similar Health exposition held in Chicago a year ago where over one hundred thousand individuals attended. There will be a series of educational exhibits in which instruction in the feeding of children will be presented by Dr. R. S. Copeland, Health Commissioner of the City of New York.

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# OF GENERAL INTEREST

Dr. Frank Whitmore and Miss Louise Bishop, both of St. Paul, were recently married.

Dr. Frederick H. Dubbe, of New Ulm, Minn., was married to Miss Lillian Steinke, of Minneapolis, in July.

Dr. A. H. Kegel, of the Mayo Clinic, has gone to Chicago to engage in the practice of surgery, with offices at 5 North Wabash avenue.

Dr. P. K. Dahl, of Minneapolis, has accepted the position of medical director of the Jordan Sulphur Springs Sanitarium at Jordan, Minn.

Dr. W. J. Kucera, of Hopkins, has gone to Chicago and New York where he will take post-graduate work in eye, ear, nose and throat diseases.

Dr. Gustaf Edlund, of St. Paul, has recently completed his interneship at the Miller Hospital and has opened offices at Snelling and Selby Avenues where he will engage in general practice.

Dr. Stella L. Wilkinson, of Duluth, has gone to Philadelphia where she will take a year's post-graduate work in gynecology and obstetrics at the Graduate School of Medicine of the University of Pennsylvania.

Dr. and Mrs. P. C. Pilon have returned to Paynesville from an extended trip through Belgium, France and Switzerland. Dr. Pilon will resume his practice, devoting his time to surgery, consultation and general work.

Dr. George W. Frasier has lately returned from Chicago where he has been taking post-graduate work. His offices will be at 205 Fargusson Building, Duluth, where he will specialize in urology, genito-urinary diseases and dermatology.

Dr. H. P. Bacon, of Milaca, has gone to Minneapolis to take up his duties in the government service as medical superintendent of the Minneapolis district for disabled veterans and government insurance of ex-service men. Dr. H. T. Norrgard is in charge of his practice at Milaca.

At the regular meeting of the Interurban Academy of Medicine held in Duluth September 21st, a paper and demonstration was given on "Fractures near the Shoulder Joint," by Dr. A. J. Braden. A paper was also presented by Dr. E. L. Tuohy on "Mitral Stenosis and Associationed Constitutional Phenomena."

Dr. G. Brelsford, medical director at Sunnyrest

Sanatorium, Crookston, has returned from a trip to St. Louis, where he went to attend the annual meeting of the Mississippi Valley Medical Association. Dr. Bosworth, of St. Paul, who is at the head of the tuberculosis work in this state, was elected president of the association.

Dr. Karl H. Van Norman, first assistant director of Johns Hopkins Hospital, Baltimore, was recently appointed head of the Miller Hospital, St. Paul. Dr. Van Norman succeeds Dr. L. B. Baldwin who resigned a short time ago. Dr. Baldwin is also head of the University Hospital and will now devote all of his time to that institution.

Dr. Thomas S. Roberts, Professor of Ornithology and Associate Curator of the Zoological Museum of the University of Minnesota, presented a lecture on Itasca Park, Friday, September 23, in the lobby of the Mayo Clinic. The lecture was under the auspices of the Mayo Foundation Chapter of Sigma Xi and the Rochester Unit of the Minnesota General Alumni Association.

The Supreme Court of the United States has recently affirmed a judgment of the Supreme Court of Minnesota sustaining one construing the state statute making it unlawful for a physician to furnish certain narcotic drugs out of his personal stock. According to the state law it is lawful to furnish an addict a prescription for a narcotic but not the drug itself. The law makes a distinction and draws the line here. While he must obey the law it is he who must decide the moral question involved in each individual case.

## NEW AND NON-OFFICIAL REMEDIES

During September the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Nonofficial Remedies:

**The Abbott Laboratories:**
**Procaine-Adrenalin Hypodermic Tablets No. 2.**

**Dry Milk Co.:**
**Protolac.**

**Hynson, Westcott and Dunning:**
**Tablets of Benzyl Succinate—H. W. and D.**

**Intra Products Co.:**
**Ampules Ven Sterile Solution Mercury Oxycyanide 0.008 Gm.**
**Ampules Ven Sterile Solution Mercury Oxycyanide 0.016 Gm.**

**Lederle Antitoxin Laboratories:**
**Acne Combined Vaccine.**
**Mead Johnson and Co.:**
**Casec.**

**N. Y. Intravenous Laboratory:**
**Losesr's Intravenous Solution of Mercury Oxycyanide.**

**Seydel Mfg. Co.:**
**Benzyl Succinate—Seydel.**

**Nonproprietary Articles:**
**Benzyl Succinate.**
**Calcium Caseinate.**

### NEW AND NONOFFICAL REMEDIES

**Beebe Protein Milk.**—Eiweiss Milch of Finkelstein.—A modified milk preparation having a relatively low content of carbohydrate and fat and a relatively high protein content. Each 100 Gm. contains approximately solids 10.2 Gm., carbohydrate 2.5 Gm., protein (casein) 5.3 Gm., fat 1.6 Gm., and ash 0.8 Gm. The acidity is stated on each package. The high protein content of protein milk is claimed to act as a preventive of fermentation and to serve as a medium in which a change in the intestinal flora takes place. Protein milk is said to be especially indicated in gastro-intestinal disorders of infants, accompanied by fermentation and diarrhea. Beebe Laboratories,, Inc., St. Paul, Minn.

**Beebe Modified Buttermilk.**—Buttermilk with Flour.—Buttermilk modified formula of Langstein and Meyer.—Buttermilk containing flour partially dextrinized by heat.—Each 100 Gm. contains approximately: total solids 9.7 Gm., carbohydrate 4.7 Gm., protein 3.3 Gm., fat 0.6 Gm., and ash 1.2 Gm. The acidity is stated on each package. Beebe Modified Buttermilk is offered as a means of combating intestinal fermentation by modifying the intestinal flora. Since it contains several forms of carbohydrates which have different periods of digestion, it is believed to afford an opportunity of assimilation without over-taxing the digestive powers. It is stated to be indicated in digestive disturbances of children and adults characterized by milk dyspepsia, fat intolerance, eczema and vomiting. Beebe Laboratories, Inc., St. Paul, Minn.

**Mercuric Oxycyanide.**—For a description see New and Nonofficial Remedies 1921, p. 194. Mercuric Oxycyanide has been proposed as a substitute for mercuric chloride. Its antiseptic power is said to be greater and it is claimed to be less irritating than mercuric chloride because it does not act on albumin to the same extent. Representative syphilographers differ as to the use of mercuric oxycyanide intravenously. Some believe that its use should be limited to hospitals; others that it has no advantage over other and safer methods of administering mercury, while others consider it safe and valuable. But all are in accord that its safe use requires experience. Mercuric oxycyanide may be administered subcutaneously, intramuscularly or intravenously in the same doses as mercuric chloride.

**Loeser's Intravenous Solution of Mercury Oxycyanide.**—Each ampule contains 5 c.c. of solution, representing 0.008 Gm. mercuric oxycyanide N. N. R. New York Intravenous Laboratory, New York.

**Ampules Ven Sterile Solution Mercury Oxycyanide, 0.008 Gm.**—Each ampule contains 5 c.c. solution, representing 0.008 Gm. mercuric oxycyanide, N. N. R. Intra Products Co., Denver, Colo.

**Ampules Ven Sterile Solution Mercury Oxycyanide, 0.016 Gm.**—Each ampule contains 5 c.c. solution, representing 0.016 Gm. mercuric oxycyanide, N. N. R. Intra Products Co., Denver, Colo. (Jour. A. M. A., Sept. 10, 1921, p. 863).

**Calcium Caseinate.**—Calcii Caseinas.—Casein from cow's milk, rendered partially soluble by combination with calcium and containing not less than 1 per cent of calcium. The diarrheal diseases of infancy are now generally treated by dietetic measures. A useful food may be made from the curd of milk and diluted buttermilk, the resultant mixture containing a moderate amount of fat, a small amount of sugar and a large amount of protein (casein) and salts, particularly salts of calcium. A mixture of calcium caseinate and milk is also used. For children, calcium caseinate is mixed with milk and water or milk and gruel in the proportion of 10 Gm. calcium caseinate and one pint of the liquid and the mixture boiled. Calcium caseinate is a yellowish powder, free from rancid or sour odor. With warm water it forms a turbid suspension. Calcium caseinate must not contain more than 10 per cent of moisture, nor more than 2.5 per cent of fat and not less than 14 per cent of nitrogen.

**Casec.**—A brand of calcium caseinate. N. N. R. Meade Johnson and Co., Evansville, Ind.

**Benzyl Succinate.**—Benzylis Succinas.—The dibenzyl ester of succinic acid. Benzyl succinate lowers the tone of unstriped muscle, its action being similar to benzyl benzoate in this respect. It is superior to benzyl benzoate in being less irritating, less nauseating and in containing a greater proportion of benzyl radicle. Its use has been suggested as a renal, biliary, uterine and intestinal colic, excessive intestinal peristalsis, dysmenorrhea, hiccough and other spasms of unstriped muscle. Its clinical use is still in the experimental stage. The dose is 0.3 to 1.0 Gm. Benzyl succinate is a crystalline, odorless and almost tasteless powder. It is almost soluble in water, but soluble in alcohol.

**Tablets of Benzyl Succinate—H. W. and D.**—Each contains benzyl succinate, N. N. R., 5 grains. Hynson, Wescott and Dunning, Baltimore, (Jour. A. M. A., Sept. 25, 1921, p. 1023).

## PROPAGANDA FOR REFORM

**Thyroid in Obesity.**—J. H. Means carried out studies which show that the basal metabolism is normal in cases of simple obesity. The widespread treatment of obesity by the administration of thyroid preparations is a device for raising metabolism to an abnormal level. The treatment of simple obesity by producing a state of hyperthyroidism has recently been designated as pernicious by Means. Simple obesity can now readily be differentiated from the obesity due to endocrine disorders by determination of the basal metabolism. If this is normal, weight reduction should not be attempted by the use of thyroid (Jour. A. M. A., Sept. 3, 1921, p. 792).

**A New Selenium Cancer Cure.**—Medical Journals have received "news items" from the "Medical News Bureau" (D. E. Woolley, manager) which announce that for the purpose of further developing methods of control and treatment of disease by the use of selenium and tellurium, the Basic Cancer Research has been organized and a laboratory established at 847 Union St., Brooklyn. Newspapers, on the other hand, have received free publicity matter from the Cosmopolitan Research Society (D. E. Woolley, secretary) according to which this society has been founded to investigate and develop methods for the treatment of cancer. It is further stated that "Dr. Frederic Klein, the eminent authority on urinology and the chemistry of cancer, has evolved a new colormetric test which is the most wonderful and valuable discovery in the diagnosis of cancer and various other diseases." Klein is the gentleman who made "Sulpho-Selene" a cancer "cure" which the Council on Pharmacy and Chemistry refused recognition some years ago. Is "Sulpho-Selene" to be resurrected? (Jour. A. M. A., Sept. 3, 1921, p. 805).

**Treatment of "hay fever."**—Although the essential features of the etiology of "hay fever" are believed to be understood, the treatment is still largely of the hit or miss type. Preparations of mixed pollens are distributed by commercial houses and used by physicians in the hope that some ingredient will prove to be potent. Several facts seem at length to be so well established that they may serve almost as axioms in the clinic of hay fever. One of these is that although the offending pollens vary in different parts of the world as well as at different seasons, the number chiefly responsible for the attack in any single locality is comparatively small. Hence it becomes the duty of the physician to familiarize himself with the offending pollens in his locality or the locality whence his patients hail. Fortunately I. C. Walker has reported on the pollens which are responsible for "hay fever" in the New England states; G. Selfridge on those in California; K. K. Koessler for Illinois, and W. Scheppegrell for the Southern states. It is important that for each case of "hay fever" the offending pollen should be determined by skin tests and also that the treatment should be preseasonal (although treatment during the season may sometimes benefit). In extenuation of the frequent failure to relieve patients, it is to be noted that certain persons have symptoms ranging from sneezing to asthmatic attacks due to the odors of flowers that have no pollen as well as to the pres-

ence of nonspecific factors in the respired air. Obviously, pollen extracts are of no avail in such cases (Jour. A. M. A., Sept. 3, 1921, p. 791).

**The Expensive "Poor Man's Medicine."**—A favorite argument of the nostrum exploiters, advanced when threatened with restrictive legislation or taxation, is that "patent medicines" are the poor man's medicine. Never had a pretension a flimsier basis of fact. The purchaser who buys a bottle of Dr. Quack's Quick Cure does not realize that about 75 cents of his dollar has been expended by Dr. Quack in an effort to convince him that he is suffering from something for which "Quick Cure" is a sure-shot remedy. The abolition of "patent medicine" advertising would do much to abolish the making of hypochondriacs by suggestion and would result in a great decrease in all drug taking. In addition, if John Doe purchased a simple home remedy, he would have to pay for the cost of the medicine only and not for an expensive advertising campaign to promote its sale (Jour. A. M. A., Sept. 10, 1921, p. 867).

**Diphtheria Preventive Measures.**—It seems likely that the securing of widespread immunity is to be an important aim in the prevention of diphtheria. In this work the Schick test, whereby the existence of immunity or susceptibility to diphtheria can be determined with ease and precision, seems destined to play an important part. Thousands of tests have been applied to school children of New York. Further, in the recent test of more than 52,000 school children of New York, those who gave a positive test were injected with toxin-antitoxin mixture to secure active immunization. If the medical profession accepts the contention that the Schick test is a reliable indication of the susceptibility to diphtheria and, further, that the currently proposed methods of toxin-antitoxin injections are effective in developing a lasting immunity, a great step in progress will have been made (Jour. A. M. A., Sept. 24, 1921, p. 1025).

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NOTICE

Minnesota Medicine will publish from time to time reports of unusual or particularly interesting cases. The reports should be submitted directly to the editorial office and should be carefully prepared.

# PROGRESS

**Abstracts to be submitted to Section Supervisors.**

## MEDICINE

SUPERVISORS:
F. J. HIRSCHBOECK,
DULUTH CLINIC, DULUTH
THOMAS A. PEPPARD
LA SALLE BLDG., MINNEAPOLIS

**AN EVALUATION OF THE ALLEN METHOD OF TREATMENT OF DABETES MILLITUS:** John R. Williams, (Amer. Jour. of the Med. Sc., July 1921.) discusses the methods of diagnosing and treating diabetis mellitus prior to and following the year 1915, at which time a change occurred due to the experimental work of Frederick M. Allen. He shows that clinical observations and statistics on diabetes made prior to 1915 are grossly inaccurate as it was commonly assumed that individuals whose urine reduced a copper solution under certain conditions had diabetes. Since that time blood chemistry and studies of the respired air have supplemented the older clinical methods of studying the metabolism. This has resulted in more accurate and trustworthy clinical observations.

The method of study employed in the author's clinic has been along the following lines: On admission, physical examination, a careful routine chemical study of the blood, including blood sugar, urea, creatinin, cholesterol and blood bicarbonate, Wassermann test and cell examination. If any of these elements are present in abnormal amounts the test are repeated every two or three days. The urine is examined daily. The food intake is regulated carefully on a basis of the blood sugar level. The diet is kept low, until the blood sugar level becomes normal, and then cautiously increased while the blood sugar level remains normal. Fast days are rarely used. Instead rest days in which the diet is decreased one-half or one-third are employed. Supplementing these observations, instruction is given the patients in the elements of food chemistry, preparation of food and personal hygiene.

He discusses the immediate and ultimate value of the treatment and answers the following questions:

1. Does the method ever restore the diabetic to health with power to use the unlimited quantities of food? It is highly improbable that a complete cure and the use of an unlimited diet can be accomplished.

2. Can severe cases always be kept from failing by rigorously following the method? Many can be kept alive, although it may be necessary to constantly readjust and maintain the diet at exceedingly low levels. A certain number of cases will succumb in spite of all fasting and underfeeding.

3. Does the method of undernourishment improve the physical condition of the diabetic enough to

make the sacrifice and expense worth while, or does it merely increase or prolong the misery occasioned by the disease? If patients properly regulate their daily activities so as not to exhaust themselves they can live with a fair degree of comfort and with greater freedom from symptoms for a much longer time than if treated by any other method.

4. Does the use of the Allen treatment add materially to the expectancy of life of the diabetic? This depends on the severity of the diabetic, complications or associated diseases and the faithfulness with which the method is adherred to. His clinical impression is that life is materially lengthened by the treatment.

He presents a series of sixteen tables, with comments on each, and gives the following conclusions from his studies:

1. Statistics as to the prevalance of diabetes, cures obtained and other data, based on former and inaccurate and incomplete methods of study are untrustworthy. It is quite impossible therefore to compare with fairness results obtained by the use of the Allen method and results obtained by methods formerly in use.

2. In spite of these difficulties an extended clinical experience covering the use of all known forms of diabetic treatment justifies the conclusion that the Allen treatment is a distinct clinical advance. While permanent cures are not obtained, nevertheless patients for a considerable time are much benefited.

3. It is difficult to say how much is added to the expectancy of life of the diabetic by this treatment. In young people in whom the disease is most serious, it would appear that it is at least doubled. Middle aged and elderly diabetics who are not too seriously afflicted with complications and when faithful to the treatment can probably survive the life-expectancy of the average normal individual.

4. The Allen method is of the greatest service when instituted early in the disease. Like tuberculosis and cancer, diabetes should be recognized and thoroughly treated in its incipiency. Most of the failures in its use are due either to serious complicating disease or more frequently to unfaithfulness on the part of the patient. In the majority of cases its value is in inverse proportion to the seriousness of the failure of metabolism.

PAUL G. BOMAN.

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**OCCULTISM WITH PARTICULAR REFFERENCE TO SOME PHASES OF SPIRITISM:** Charles K. Mills, (The Amer. Jour. of Med. Sc., July 1921.) The Philadelphia Neurologist reviews in this article a subject which does not come entirely in the catagory of medically useless knowledge. He defines the term "mysticism" as commonly used, to be more or less synonomous with occultism.

The horrible sacrifice of lives during the world war acted as an exciting cause, but back of that there is a more profound reason—"a resurgence of that which is primitive." The terrible calamities of war aroused instincts and emotions and removed men, for a time, from the control of sound reason. Crimes, so prevalent today, he states are best explained psychologically as a turning, under peculiar stress, to instinctive tendencies.

The question naturally arises: What kind of men interest themselves in spiritualism? Some famous scientists have become enthusiastic supporters of spiritualism. He characterizes these men as leading lives in which reason and investigation pursue their way side by side with mystic tendencies. These men, whole performing valuable scientific investigations on the one hand, nevertheless give evidences of marked mystical, or more plainly, instinctive and emotional tendencies not subjected to the usual intellectual control.

Ghosts are intimately associated with spiritualism in the minds of the public. He calls attention to the fact that many ghost stories have clearly fraudulent features. These are explained on the theory of hallucination, leaving out consideration of the definitely insane. Apparitions, to his experience in the majority of cases, occur in the period preceding deep sleep or in the period immediately after. Visual and other sensory hallucinations, it should be remembered, are indications of disordered cerebral action.

The so-called psychics, with their well known temperaments or well known constitutional tendencies, are of course easily influenced by mystic impressions. Concentration or disturbance of attention of spiritualists about their table may, and sometimes does, bring about muscular action induced by hypnotic phenomena of the auto or hetero suggestive type, so commonly misinterpreted.

Dr. Spiller characterizes men whom he has seen acting the part of mediums as "fat or fragile, sleek or frowzy!"

J. C. MICHAEL.

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**CLINICAL INVESTIGATION OF THE PHENOLSULPHONEPHTHALEIN TEST:** W. F. Braasch and E. C. Kendall, (Jour. of Urol. Feb. 1921.) The authors recognize the phenolsulphonephthalein test as a distinct clinical aid in the measure of kidney efficiency, but feel that the tendency has been to interpret every diminished phenolsulphonephthalein output as indicating actual impairment of kidney function. Other extra-renal factors must be considered in correctly interpreting the results of this test. A study of these factors was felt necessary because of the fact that the two hour phenolsulphonephthalein return following intramuscular or subcutaneous injection was frequently lower than other clinical data would indicate.

The investigation of these extra renal factors was carried out along two lines:

(1) to determine whether or not any conditions arise in the tissues of the human organism during which the phenolsulphonephthalein can be actually destroyed before it reaches the kidney and can be excreted by it. It was found that the phenolsulphonephthalein is destroyed in the tissues in the absence of oxygen, but that clinically the destruction of the phenolsulphonephthalein in explaining the low phenolsulphonephthalein output can be excluded in any cases in which a condition of cyanosis is not obvious to the eye.

(2) to investigate the possibility of the simple retention of the phenolsulphonephthalein in tissues other than the kidney. This study was carried on in the main by comparing the results secured following intravenous injection of the dye with those following intramuscular or subcutaneous injection More interesting results were obtained in this particular and are summarized by the authors as follows:

1. The clinical problem involved in the phenolsulphonephthalein test may not be alone whether the kidney itself is capable of excreting it but whether the kidney has the chance to excrete it.

2. Patients with urinary obstruction undergoing preparation for prostatectomy will frequently have a low phenolsulphonephthalein output following intramuscular injection and a normal output following intravenous.

3. The intramuscular injection probably gives a more accurate index of the condition of the tissues, but the renal capacity is best estimated after intravenous injection.

4. When true nephritis with actual destruction of renal cells exists there is but little difference in output following intramuscular and intravenous injection.

5. The extent to which phenolsulphonephthalein is retained in the tissues is influenced by the degree of acidosis. If rendered alkaline the tissues will readily liberate it.

6. Following alkalization of the urine the phenolsulphonephthalein output with intramuscular injection is apparently higher.

7. With nephritis alkalization of the urine has but little effect on the output.

8. In the presence of cardiac insufficiency accurate estimation of the renal function is obtained best by intravenous injection. The difference between the intramuscular and intravenous output offers a fair index of the comparative degree of cardiac and renal impairment.

L. S. YLVISAKER.

## GYNECOLOGY AND OBSTETRICS

SUPERVISORS:
ARCHIBALD L. McDONALD,
FIDELITY BLDG., DULUTH.
ALBERT G. SCHULZE,
LOWRY BLDG., ST. PAUL.

**A STUDY OF CHRONIC ENDOCERVICITIS:** Mathews. (Surg. Gyn. and Ob. Vol. 32, No. 3.) The author refers to the work of Curtis and Stumdorff in considerable detail. The anatomical peculiarities of the cervical mucosa with its deep racemose glands render this region more susceptible to infections. Cervicitis may be primary, or less often is secondary to infection in the uterus or vagina. Etiology includes trauma, from lacerations, instrumental dilatation, curretage, and the use of stem pessarys. Causal organisms in the use of stem pessarys. Causal organisms included; Gonnococcus, Staphylococcus, Streptococcus and B. Coli. Pathologically there is an eversion of the columnar cervical epithelium with the formation of a so-called "Erosion." The glands become dilated and closed forming the Nabothian follicles. There is general hypertrophy of the stroma with round cell infiltration. The symptoms and course vary with the individual. There is persistent leucorrhoea, increased before and after menstruation. The author holds that infection often extends into the parametrium and causes various forms of pelvic inflammatory disease. There is frequently thickening of the uterosacral fascia and menstrual backache. There may develop a permanent sterility due to cervical infection.

Treatment: The author has little faith in local palliative measures. He describes in detail the Stumdorff operation with excision of the cone-shaped, gland bearing cervix and, plastic repair. Results: of 200 patients with severe endocervicitis operated on at least six months ago! 64% were cured, 24% improved and 8% unimproved.

ARCHIBALD L. McDONALD.

**MISSED ABORTION:** Rongy, (Surg. Gyn. and Ob. Vol. 33, No. 2.) The average pregnant woman is rarely attracted to pathological conditions unless these are accompanied by pain, and is interested only in two periods; quickening and labor. Death of the fetus may occur many weeks or months prior to being expelled, a fact of medico-legal significance. There is a small amount of literature on missed abortion and lack of agreement as to definition. According to Frankl and Duncan it includes all cases of death of the fetus prior to viability and its retention within the uterus to the expected date of labor or beyond. Many cases are noted where the duration of pregnancy is out of proportion to the size of the uterus, and subsequent examinations demonstrate

that there is no increase in the size of the uterus. Later there is change in consistency, resembling a fibroid, and there may be constitutional effects.

There are two conditions to explain; 1. Death of the fetus, due to disturbance of maternal or fetal metabolism. This often occurs in well nourished women, and conversely, those suffering from marked organic disease go to term with well developed babies. The condition is sometimes repeated in the same individual and the authors suggest a possible relationship to the glands of internal secretion. 2. One must explain the retention of the dead fetus in the uterus. The authors believe that the rapidity with which the product of conception is thrown off, depends on the manner of death. They explain three types of abortion. 1. An acute sudden disturbance with, hemorrhage, pains, and uterine contractions, and prompt expulsion of the contents. The uterine surface of the placenta is displaced by bloodclot and separated. Expulsion is prompt and occurs before there is time for maceration. 2. A less acute process with discomfort or light pains, and irregular spotting extending over a period of two or three weeks. The condition may be controlled and the woman go to term, or hemorrhage occur, followed by expulsion of the contents. The placenta contains many small infarcts with necrosis, and the fetus is usually macerated. It is assumed that insiduous changes occur at the placental site, but that the fetus is not thrown off till the process has become extensive. 3. A group of cases where the clinical course has not been studied but death of the fetus occurs due to changes in the cord and it is believed that the placental pathology is secondary. The process is slow in development, circulation continues for some time, and the product of conception does not become a foreign body till the placenta is completely disorganized. Expulsion of the uterine contents is delayed for a variable period and this condition is called a "Missed Abortion." The diagnosis may be confused with a myoma, though the history should be suggestive. Treatment is: dilation and curretage in the early cases, and induction of labor where the pregnancy has advanced eight weeks. Special care is necessary to avoid perforating a uterus which may be very friable.

ARCHIBALD L. MCDONALD.

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**SOME CHEMICAL STUDIES IN NORMAL AND ABNORMAL PREGENANCIES:** Killian and Sherwin, (Amer. Jour. of Ob. & Gyn., July 1921.) The authors' conclusions, briefly stated, are as follows: Normal pregnancy shows low values for nonprotein and urea nitrogen, the latter forming 44 per cent of the former. No change in uric acid, creatinine, chloride or sugar content of the blood as compared with the nonpregnant. A slight decrease in the combining power of the plasma shows in the last months of normal pregnancy.

In nephritic toxaemia the chemical blood changes are typical of impaired kidney function; nonprotein and urea nitrogen are increased, the latter forming 50 per cent. Emptying of the uterus affords but slight improvement.

Analogous changes are found in pernicious vomiting, postpartum eclampsia and eclampsia with gravid uterus; the nonprotein nitrogen is increased but the urea is decreased, being at the low normal limit. Definite increase in uric acid. A moderate or severe acidosis is observed in all cases. A prompt improvement follows in most instances after evacuation of the uterus.

ALBERT G. SCHULZE.

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**THE BLOOD CHEMISTRY IN NORMAL AND ABNORMAL PREGNANCY:** Caldwell & Lyle, (Amer. Jour. of Ob. & Gyn., July 1921.) Their conclusions are as follows: In normal pregnancy, as compared to the nonpregnant, there is a low total nonprotein nitrogen, a low urea nitrogen and low ratio of the latter to the former. The nitrogenous constituents of maternal and fetal blood at end of labor are practically identical. A definite retention of uric acid at end of labor is found in abnormal cases only. Marked kidney insufficiency, as shown by high retention of nitrogenous waste products, warrants a very grave prognosis. High creatinine retention is given the same interpretation. Failure of the nitrogenous constituents to return to normal early in convalesence justifies a doubtful prognosis for subsequent pregnancies. A rapid return to normal justifies a good prognosis for subsequent pregnancies.

ALBERT G. SCHULZE.

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**A CRITICAL ANALYSIS OF TWENTY-ONE YEARS' EXPERIENCE WITH CAESAREAN SECTION:** J. Whitridge Williams, (Bul. of The John Hopkins Hosp., June 1921.) The author gives a most instructive and masterly analysis from every viewpoint of 183 operations done upon 145 patients. His conclusions, briefly stated, are as follows: The material covers 21 years, up to December 31, 1920; it was furnished by approximately 20,000 deliveries, equally divided between black and white patients and comprise 104 single and 79 repeated operations. The ratio of operations in blacks and whites was 114 to 69 for the single and 30 to 11 for the repeaters.

The gross mortality was 5.46 per cent, the net mortality was 3.45, for the conservative operation it was 4.07 and for the Porro it was 1.82. The mortality was 13 times higher in the first fifty than in the last 133, due, not to any marked change in operative technique but rather to increased experience and early operation. All deaths but one were due to infection. The conservative section late in labor is always dangerous; Porro section relativly

safe. The best means of lowering mortality in the conservative section due to disproportion is by learning to determine before the onset of labor if operation will be required or not.

Disproportion due to contracted pelvis was the indication in nine-tenths of the blacks and in six-tenths of the whites. Various forms of rachitic pelves in the blacks and simple flat pelves in the whites were the predominant indications. Eclampsia and serious cardiac decompensation were the chief non-plevic indications.

Caesarean section is not the ideal treatment for eclampsia except in the presence of a rigid and undilated os and failure to improve with venesection. It is rarely indicated in placenta praevia; only one section in 66 cases in this series.

Generally speaking the patient should be sterilized at the third section either by amputating the uterus or sectioning the tubes. The author uses the low incision. The uterus should be incised in situ and eviscerated only in the presence of infection. The latter procedure increases infection in normal cases. The uterus should be sutured in layers using the greatest care in the approximation of the peritoneal edges.

The uterine scar ruptured only once in 48 repeaters as well as in 12 spontaneous deliveries subsequent to section. "Once a Caesarean always a Caesarean" is not correct. On the other hand the possibility of rupture must always be faced and is the strongest argument against unnecessary section for non-pelvic conditions.

Insertion of the placenta on the anterior wall offers no objections. Only 7 per cent of babies were deeply asphyxiated. In spite of the value of pituitrin atony of the uterus must always be reckoned with and called for amputation of the uterus in two of the cases.

Uterine adhesions were absent in one quarter of the repeaters and were extensive in one-third of them. Not only infection but imperfect approximation and other traumatic factors are responsible for adhesions.

The operation is not without danger; it is safe under appropriate conditions and before the onset of labor. The author thinks the operation is abused; should be be performed only when absolutely necessary and while it often offers the easiest manner of delivery it is not always the safest.

Only one case in thirty of contracted pelves was sectioned.

ALBERT G. SCHULZE.

## ROENOLENTGOGY

SUPERVISORS:

C. U. DESJARDINS,
MAYO CLINIC, ROCHESTER.

R. G. ALLISON,
SYNDICATE BLDG., MINNEAPOLIS.

**CONTRIBUTION TO THE KNOWLEDGE OF GENERAL HYPERPLASTIC PERIOSTITIS OF CHIDHOOD:** (Osteoarthropathie hypertrophiante pneumonique Pierre Marie.) T. Heissen, (Fortsch. a. d. Gebiete d. Roentg. Band 28, Heft 3. p. 239, August 1921.) This condition was first described under the name of Osteoarthropathie hypertrophiante pneumonique as a secondary hyperostosis of all the bones of the extremities in accession to a chronic pneumonic process and with contemporary joint changes. Experience has shown that other pathological conditions can occasion the same changes, the most important being chronic purulent processes, chronic intoxications especially lues and malignant tumors. Hyperostosis also occurs without demonstrable primary disease. The symptom complex has later been changes because of the lack in the majoirity of cases of joint changes.

The author reports the case of a 21 year old boy who, at the age of 4 years had a rib resection because of a left sided meta-pneumonic empyema. A small sinus has persisted during the 8 years. The clubbing of the fingers began one year after the operation and has progressively increased.

Roentgenologically there was an equal hyperostosis of all the phalanges of the hands and feet, the enlargement being in both the longitudinal and transverse direction. The bone structure itself was entirely normal and the enlargement was not due to an apposition of calcium as in ossifying periostitis but to a true ossal hypertrophy. Less pronounced were the changes in the carpal and tarsal bones. The distal end of the forearm and leg showed pronounced changes, most marked in the transverse diameter, while the diaphysis and proxiaml ends were little involved. The humerus and femur showed only slight changes in the transverse diameter of the condyles. The points showed no changes outside of the general enlargement of the bones. The skull thorax and pelvis were roentgenologically negative.

The authors case differs from other cases not only in the site of the enlargement but also in the lack of any periosteal proliferation. Freytag has described a case of club fingers in a 5 year old child where the enlargement was due entirely to swelling in the soft tissues. This enlargement disappeared with restitution to normal after curing the primary disease.

The author believes that the growing child behaves differently in this process than an adult in

that periosteal proliferation is absent and the change is a true ossal hypertrophy.

R. G. ALLISON.

**CONTRIBUTION CONCERNING THE ETIOLOGY OF THE SO-CALLED CASCADE STOMACH:** R. Stupel; (Fortsch. a. d. Gebiete d. Roentg. Band 28, Heft 3. p. 229, August 1921.) The cascade stomach because of its manner or origin as well as its behavior and appearance occupies a special place among the greatly different forms of hour glass stomach. This type of stomach is split up into two characteristically formed parts. The cardial part of the stomach with the gas bubble has a flat spherical shape, while the pyloric end is more pouch like. These two parts, which are connected by a bent narrow area, "the bridge," are so placed in relation to one another that the upper cardial sphere is situated posteriorly and dorsalward, the pyloric pouch inferiorly, anteriorly and medial.

During ingestion of a contrast meal one first sees the upper part fill to a certain level and then the meal rushes cascade like down into the pouch. In a true organic cascade stomach this filling phenomena and the form of the stomach remains constant during repeated examination.

The cause depends upon a raffing of the greater curvature by scaroor adhesion formation following an ulcer, perigastritis or a general peritonitis. Frequently cascade-like stomachs are seen which are caused by a gas filled splenic flexure of extra-gastric tumor, and these are only temporary findings.

The author reports such a case of accidental cascade stomach which was due to a tumor located between the stomach and spleen. After resolution of the tumor under x-ray therapy the stomach resumed its normal form.

The author reports two cases of true cascade stomach both of which were due to congenital defects. In the first there was a dislocation of the caecum and ascending colon into the left hypochondrium. In the second case there was an eventration of the right diaphragm with dislocation of the colon and liver.

R. G. ALLISON.

## PEDIATRICS

SUPERVISORS:
FREDERICK C. RODDA.
CHILDREN'S CLINIC, MINNEAPOLIS.
ROY N. ANDREWS,
MANKATO CLINIC, MANKATO.

**INDICANURIA IN THE NEW-BORN:** B. E. Bonar, (Amer. Jour. of Dis. of Child., April 1921.) Von Reuss found indican in the urine in breast fed children during the first nine days of life rather frequently, often without the observation of any clinical symptoms. He states that it occurs in the well nourished, in the undernourished, in the constipated, and in the diarrhoeic infants. It was rarely obtained on the first and second days, but most frequently found on the third and fourth day. The dispropotion between the intensity of the indicanuria and the putrefactive manifestations in the stool was noted. The fact that Hecht was unable to recognize indol in the meconium suggests that indican may result from the breaking down of tissue protein. A complete urine examination was made whenever a positive indican reaction was found. All such examinations failed to reveal any pathologic findings.

Out of 338 specimens of urine tested, twenty-eight showed postive indican reactions. The reactions occured most frequently and were more intense on the third, fourth and fifth days. No reactions were obtained on the eighth, ninth, eleventh, twelfth and fifteenth days. Of significance is the fact that indicanuria most frequently is obtained during that period of life when the transitory fever of the newborn, and the transition from meconium to milk stools occurs, when the weight has reached the lowest point.

There are probably two sources from which indican is derived. The first is decomposition of tissue protein and the second is putrefaction of protein in the bowel. Destruction of tissue protein to a considerable extent occurs during the first few days of life and particularly during the first five or six days of life. An initial loss of weight is common during the first five days, a larger portion of which is due to loss of body fluids but evidently some destruction of tissue protein takes place during this period when the infant receives insufficient nourishment. The presence of a relatively high amount of uric acid in the urine of the new-born brings forth further evidence of the possible destruction of tissue protein.

Decomposition of protein in the bowel is usually considered the chief source of indican in the urine. The findings of indicanuria in the new-born suggests two possibilities other than parenteral formation; that is, increased absorptive action of the bowel, and increased putrefaction in the bowel. Von Ruess speaks of the disproportion between the putrefactive manifestations in the bowel and the intensity of indican reaction. It is known that the bowel in its

entire length contains bacteria within twenty-four hours after birth. The possibility of putrefaction of intestinal contents is therefore apparent. The introduction of fluids into the gastro-intestinal tract supplies the moisture necessary for the growth of putrefactive bacteria. The transition of meconium to the milk stool is a gradual process taking several days. Thus it may be possible that during this transition to the milk stool there is an increased amount of putrefaction in the bowel.

R. N. ANDREWS.

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**USE OF INTRAMUSCULAR INJECTIONS OF CONVALESCENT SERUM IN SCARLET FEVER:** Paul Bode, (Archiv. fur Kinder. Vol. 69, No. 3, p. 258.) The author reports the results of treatment of 30 cases of scarlet fever all of which with the exception of 3 cases were of the severe toxic type with intramuscular injections of serum obtained from convalescent patients.

The donors were all above 12 years of age, free from tuberculosis and syphilis and in the 4th-6th week of their convalescence. The recovery in all cases had been uneventful with no complications. From 100-200 c. c. of blood was obtained, kept on ice until the serum separated which was then filtered, and 1/10 of its volume of 0.4 per cent phenol added. It was then kept on ice until used, this interval never exceeding two months.

He injected 40-100 c. c. of this serum, depending upon the severity of the symptoms and the size of the child, intramuscularly preferably into the gluteal muscles.

He reports very favorable results from this treatment. There was usually a very definite effect upon the temperature, which after a slight initial rise fell within a few hours in one of four ways viz: 1. By crisis. 2. By rapid lysis. 3. By a sharp remission. 4. By a remission followed by a more prolonged lysis. Crisis was not accompanied by any signs of collapse, but on the contrary by an improvement of the character of the pulse and other symptoms.

The effect on the general condition was even more striking. Patients previously delirious often fell into a sound sleep from which they awakened mentally clear. Others who had been in a deep stupor, often after 12 hours, sat up in bed and were rational. There was no appreciable effect upon the character of the eruption in the majority of the cases, and the desquamation was not affected.

His observations do not confirm those of Huber and Blumenthal that the sequellae are prevented by the use of the serum. He encountered them as frequently as would probably have otherwise been met in cases not treated with the serum. He believes that the complications are due to a secondary invasion of streptococci and that the serum is only effective against the unknown virus of scarlet fever itself. Possibly if used earlier it might be of greater value in this respect.

His investigations done independently but concurrently with those previously reported by others confirm in a general way the statements as to the beneficial effect of convalescent serum in this disease. He urges that it be used as early as possible and in sufficient dosage. The intramuscular route he believes to be equally as effective as the intravenous, and much simpler and less dangerous. The only reaction encountered was in a case in which serum, the donor of which had also received serum, was given. There were symptoms of collapse which soon passed over. Others have reported similar instances. In these cases the reaction was probably due to an anophylotoxin in the serum of the donor.

M. D. OTT.

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**E. E. HUGHES,** (British Journal of Children's Diseases, Vol. XVIII April-June 1921) reports a case of Empyema of the Maxillary Antrum in an infant of three weeks. The child had been delivered by instruments, and it was a vertex presentation. The condition had come on gradually probably having its origin at birth. There was swelling, redness and odema of the left cheek and the lower eye lid with a sence of fluctuation and egg-shell crackling over the centre of the superior maxilla. There was also a profuse left-sided nasal discharge, proptosis, slight epiphora, unilateral buldging of the palate and discharge of pus into the oral cavity through the upper alveolus on the left side. An incision was made into the upper alveolus with the evacuation of a large quantity of pus. Two unerupted teeth were accidently removed. Daily irrigations brought complete recovery in three weeks.

E. F. ROBB.

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**TREATMENT WITH ADRENALIN OF SEVERE PULMONARY INFECTIONS IN INFANTS:** Joseph Vogl. Arch. fur Kinder. Vol. 48, No. 3, p. 213.) The author reports his experience with the subcutaneous injection of adrenalin in infants ill with capillary ment of tuberculous adenitis to avoid deformity and bronchitis and bronchopneumonia during the influenza epidemic of 1918. Sixty hospital patients with mortality of 6%, and 30 of 50 out patients were thus treated. Of the latter, the mortality was 13½% among those treated, as compared with 45% among those untreated. He injected 0.2 c.c. in small infants and 0.2 to 0.5 c.c. in older infants. From 3 to 8 injections were given daily depending upon the severity of the case. There was usually a rapid and marked decrease in the cyanosis and dyspnoea which attributes to a dilatation of the unaffected bronchi. He also believes that the vasoconstrictor action of adrenalin on the pulmonary vessels decreased the tendency to congestion and to exudation in the bronchi. If too large a dose be given, there is often vomiting and rarely a temporary state simulating collapse. The adrenalin was used in conjunction with the customary therapeutic measures employed in pneumonia.

M. D. OTT.

# BOOK REVIEWS

**THE WASSERMANN TEST.** Craig. Second Edition—1921 (C. V. Mosby Company, $4.25).

This book especially in its enlarged and revised edition commends itself alike to the technical laboratory worker and to the general practitioner because of its comprehensive treatment of a most popular laboratory test for one of the most important and serious diseases of the present time.

The laboratory worker will find a detailed consideration of the Wassermann test from a technical point of view. The author's own method, a combination of the old Wassermann and the Noguchi technic, now used in all army laboratories, is given in detail. Other various modifications presented from time to time in the literature are also given with a frank discussion of their advantages and disadvantages.

The practiving physician will find a comprehensive history of the test and its interpretation as regards influencing factors, nature of the reaction itself, time of appearance in various stages of the disease and also its disappearance in the various stages. The specificity of the reaction, its value as an index of the prevalence of syphilis in communities and a control of the treatment of syphilis, is treated in a most able manner, augmented by a bibiliography of 177 references to the literature on the subject.

The reaction in the spinal fluid also is discussed as well as the allied spinal fluid tests. The Colloidal gold is given especial prominence in a chapter containing a most complete and modern treatise of that subject.

Several points of especial interest well brought out by the author are. (1) One test is of little value as even the strongest reactions if taken every day, will occasionally be temporarily negative. (2) A negative test following treatment frequently "relapses" to a positive in a few weeks or months, therefore necessitating frequent tests over long intervals before pronouncing a patient cured. (3) The injection of alcohol up to 24 hours before taking the blood for the test may change a positive to a negative reaction. (4) Certain bacteria in blood serum to be tested may give a false positive reaction. (5) Solutions of the Treponema pallidum while logically the best antigen proves to be in actual practice much inferior to the old alcoholic extracts of organs (heart or liver). (6) Ice box incubation of the simple alcoholic antigen is more delicate and will yield more positives than the incubator or water bath.

This second edition is a much more complete discussion of the subject than the first, occupying as it does, 4 additional pages and 39 additional references. It is a book well deserving of a place in the library of any physician practicing any specialty of the science of medicine.

MARGARET WARWICK.

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**Compound of diseases of the Skin:** Jay Frank Schamberg, M. D. Price $2.00. The purpose of a compend is to present information in a condensed form for the use of students. One may say that the present edition answers this purpose very well. It gives evidence of having been very carefully revised and contains some of the later methods of treatment. The chapter on the treatment of syphilis is to be commended.

E. C. GAGER.